INFORMATION PROCESSOR AND ITS OPERATING METHOD

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- 45.3 (INFORMATION PROCESSING--- Input Output Units)

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- R139 (INFORMATION PROCESSING--- Word Processors)

Abstract:

PROBLEM TO BE SOLVED: To make the processor thin and lightweight and to efficiently input characters, etc., by detecting pressure applied to positions corresponding to respective keys of a virtual keyboard displayed on a display screen, and performing input processing for a character string, etc., according to the pressure signals of the detected keys.

SOLUTION: A transparent plate type tablet device 240 having lattice-shaped grids arranged detects pressure applied to all the grating points at the same time and inputs pressure data on all pressure sensing points to an applied pressure distribution processing module 241 at constant time intervals. The pressure distribution processing module 241 detects information regarding whether respective keys including modification keys are pressed at constant time intervals, detects whether or not each key is pressed newly or continuously according to whether its data rise or fall, and sends the result to a central processor 231 and also informs the central processor 231 of information showing whether or not the position or kind of the display keyboard, etc., is updated.

CORRECTION OR AMENDMENT

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[FI]
G06F 3/033 360 G

[Procedure amendment]
[Filing Date] October 8, Heisei 14 (2002. 10.8)
[Procedure amendment 1]
[Document to be Amended] Description

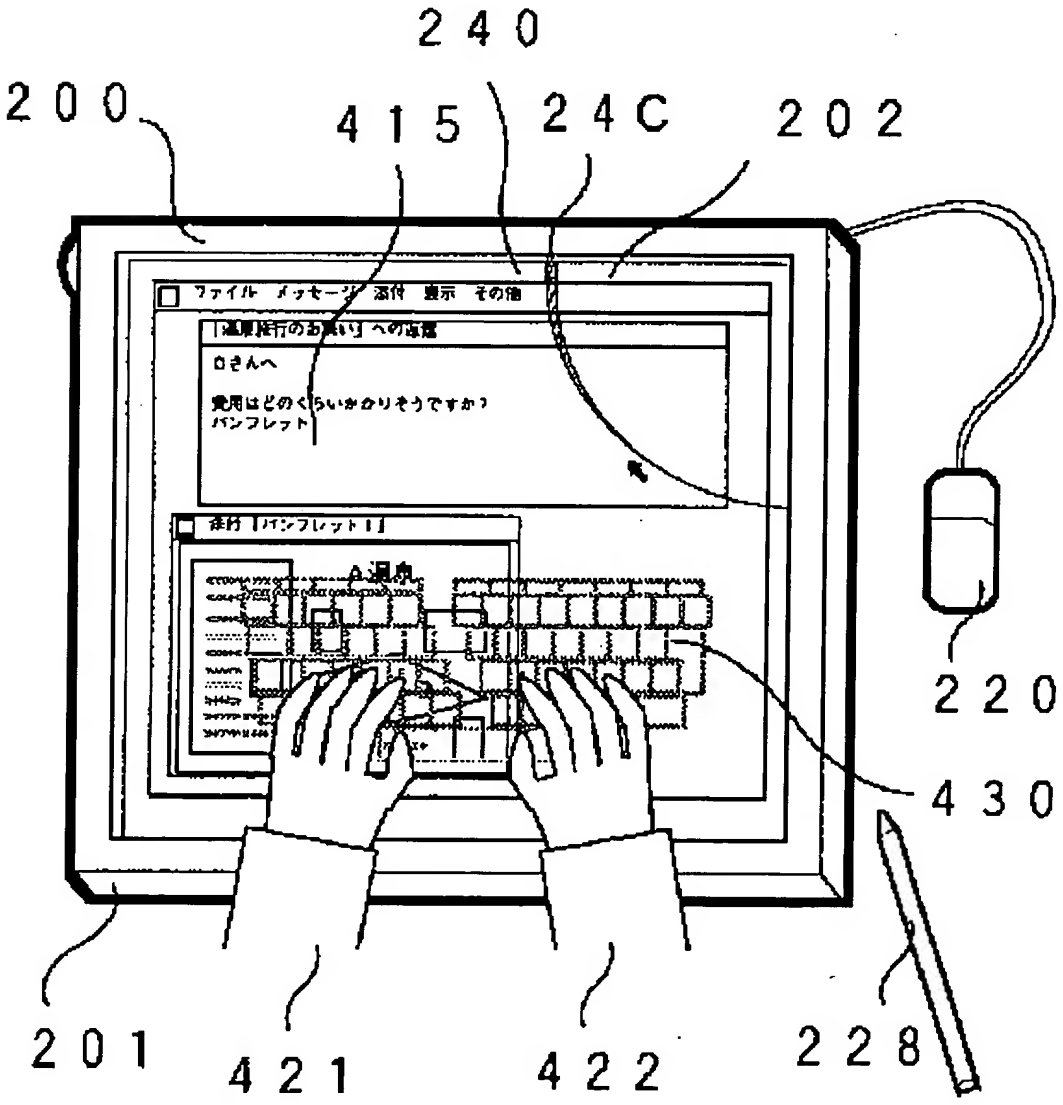
[Item(s) to be Amended] The name of invention
[Method of Amendment] Modification
[Proposed Amendment]
[Title of the Invention] An information processor and the information processing approach equipped with the touch panel
[Procedure amendment 2]
[Document to be Amended] Description
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] In the information processor equipped with the touch panel the touch panel which detects the touch location of a directions means is prepared in the display screen of a display panel, touches the touch operating member displayed on this display screen, and it enabled it to operate,
A detection means to detect the thrust P by the directions means at the time of carrying out touch actuation of this touch operating member,
When the detected pressure force setting pressures P1 and P2 (however, 0<P1<P2) are formed beforehand, and according to this detection means is P1 <=P<=P2, When 1st processing is performed and this thrust P changes from P1 <=P<=P2 to P2<P, It is the information processor equipped with the touch panel which it has the control section which performs 2nd processing, and said 1st processing is modification of the content of a display displayed on said display screen, or a display gestalt, and is characterized by said 2nd processing being activation of actuation of this touch operating member.
[Claim 2] In claim 1,
The information processor equipped with the touch panel characterized by performing said 2nd processing when said thrust P of the location corresponding to said touch operating member is set to P2<P in the condition that said 1st processing is performed.
[Claim 3] In claims 1 or 2,
It is the information processor equipped with the touch panel characterized by for said 1st processing being processing which displays a keyboard on said display screen, and said 2nd processing being processing to which it is supposed that the key corresponding to the location where the thrust of P2<P was detected among said keyboards was pressed.
[Claim 4] It is the information processing approach using the touch panel detects the touch location of a directions means with the touch panel prepared in the display screen of a display panel, touches the touch operating member displayed on this display screen, and it enabled it to operate,
The thrust P by the directions means at the time of carrying out touch actuation of this touch operating member is detected,
Setting pressures P1 and P2 (however, 0<P1<P2) are formed beforehand, when the thrust by said detected directions means is P1 <=P<=P2, 1st processing is performed, and 2nd processing is performed when this thrust P changes from P1 <=P<=P2 to P2<P,
It is the information processing approach using the touch panel characterized by for said 1st processing being modification of the content of a display displayed on said display screen, or a display gestalt, and said 2nd processing being activation of actuation of this touch operating member.

[Claim 5] In claim 4,
The **** information processing approach for touch panels characterized by performing said 2nd processing when said thrust P of the location corresponding to said touch operating member is set to P2<P in the condition that said 1st processing is performed.

DRAWINGS

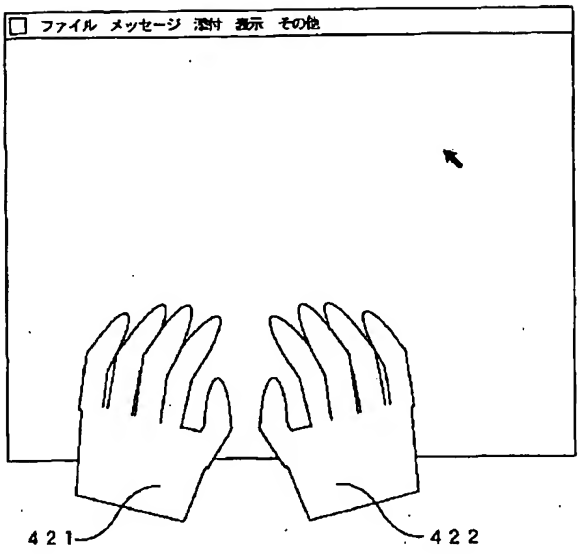
[Drawing 1]

図 1



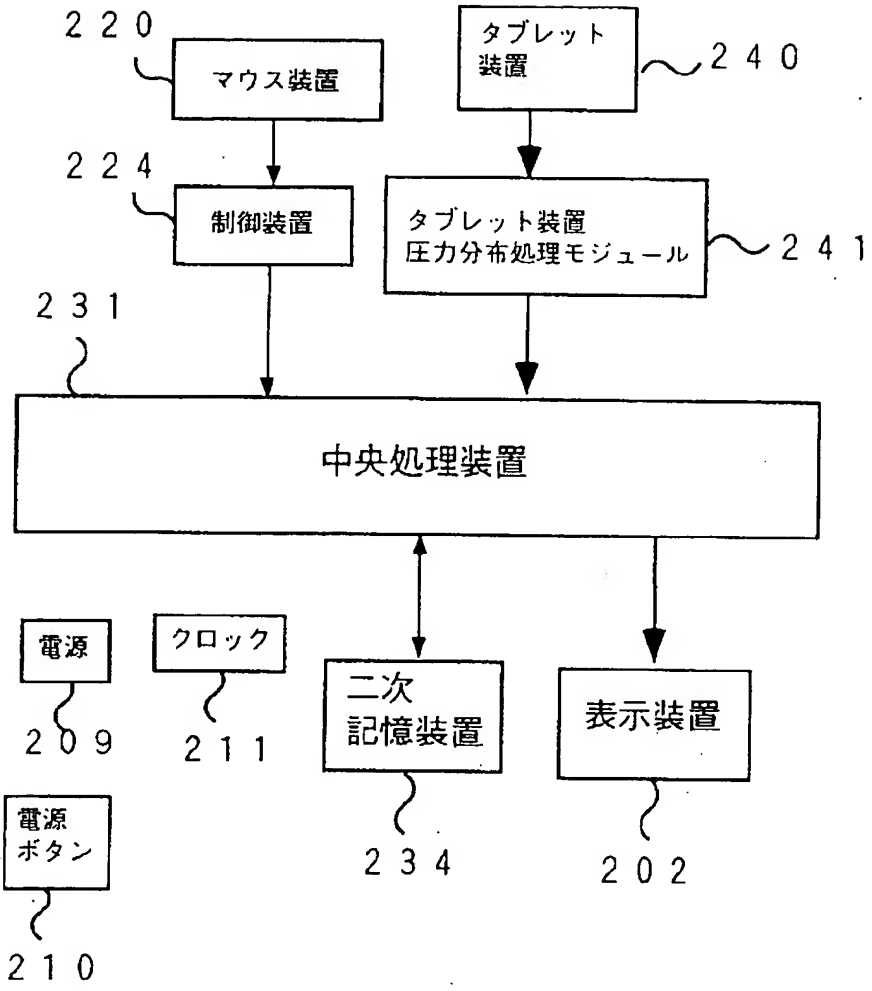
[Drawing 4]

図 4



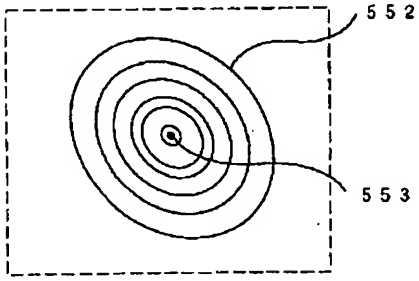
[Drawing 2]

図２



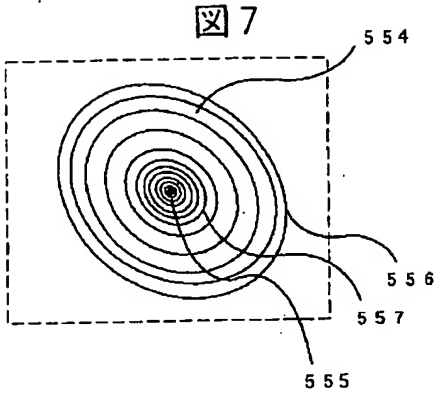
[Drawing 6]

図６



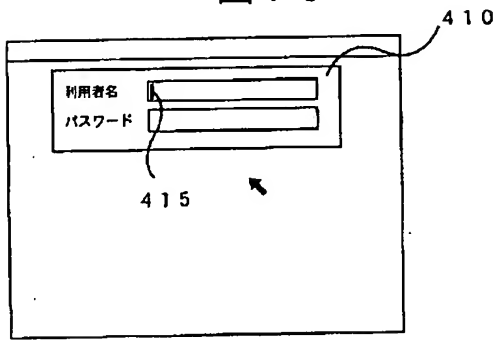
[Drawing 7]

図7



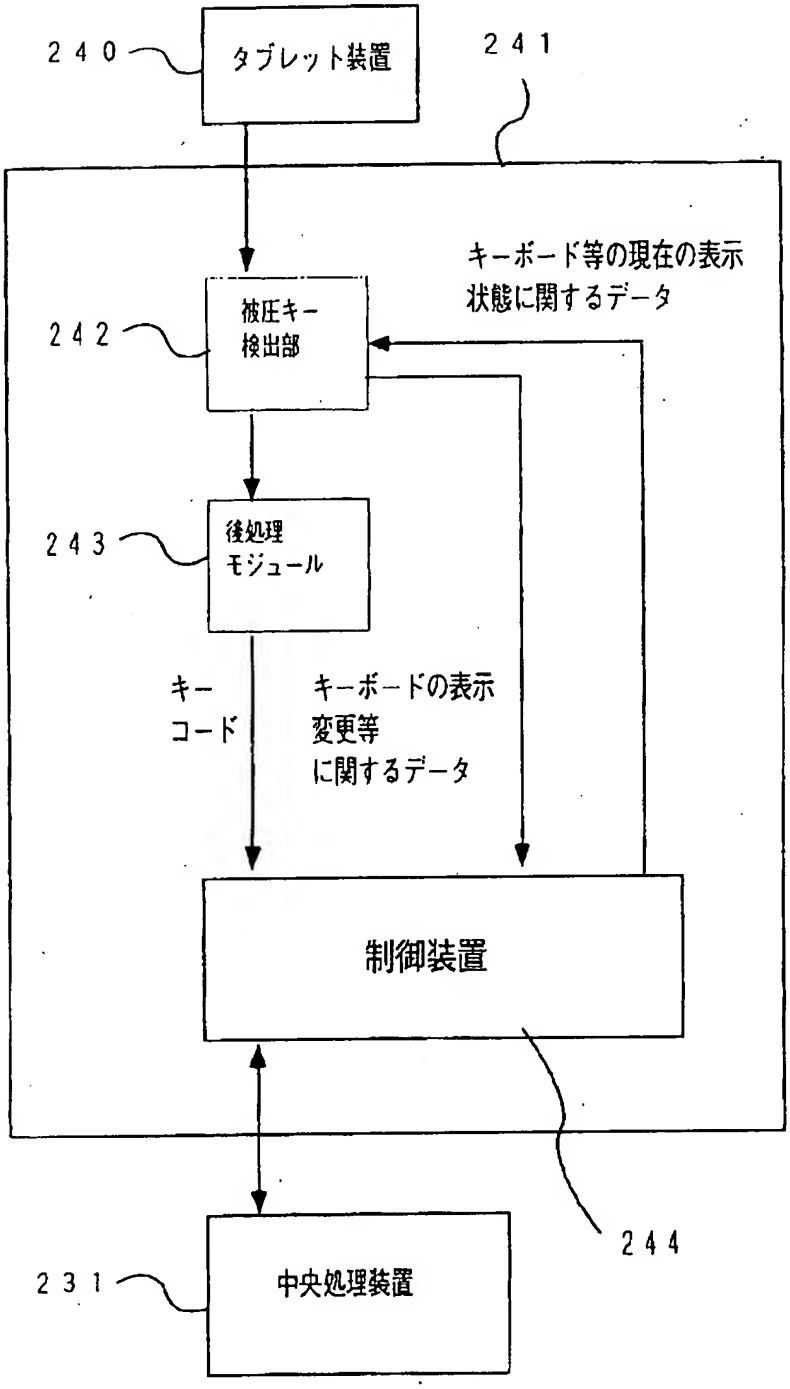
[Drawing 18]

図18



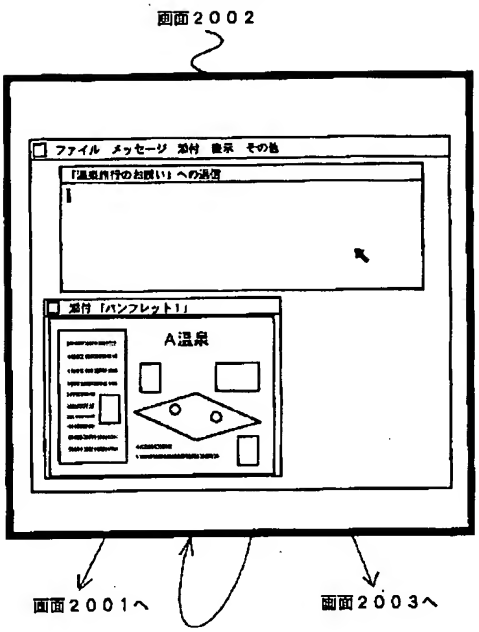
[Drawing 3]

図 3


240
タブレット装置
241
キーボード等の現在の表示
状態に関するデータ
242
被圧キー
検出部
243
後処理
モジュール
キー
コード
キーボードの表示
変更等
に関するデータ
制御装置
244
231
中央処理装置

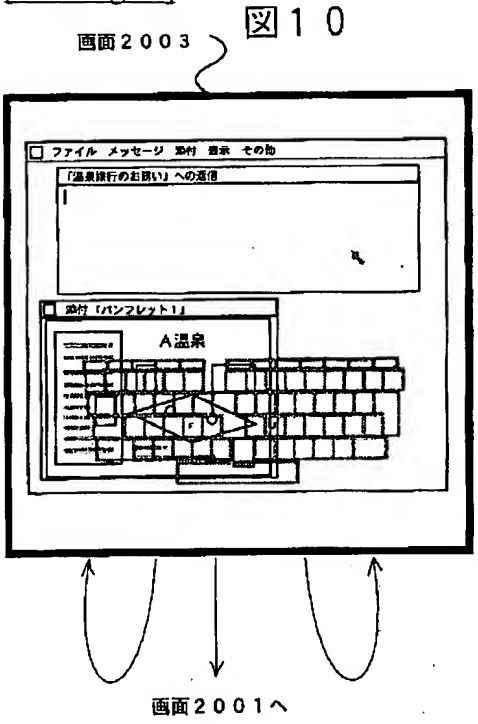
[Drawing 9]

図９



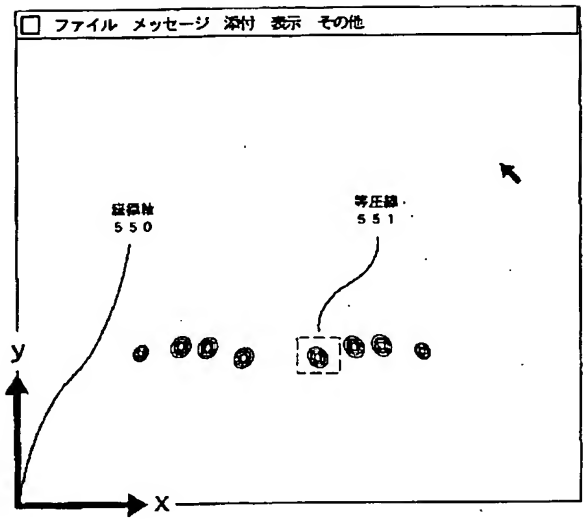
[Drawing 10]

図１０



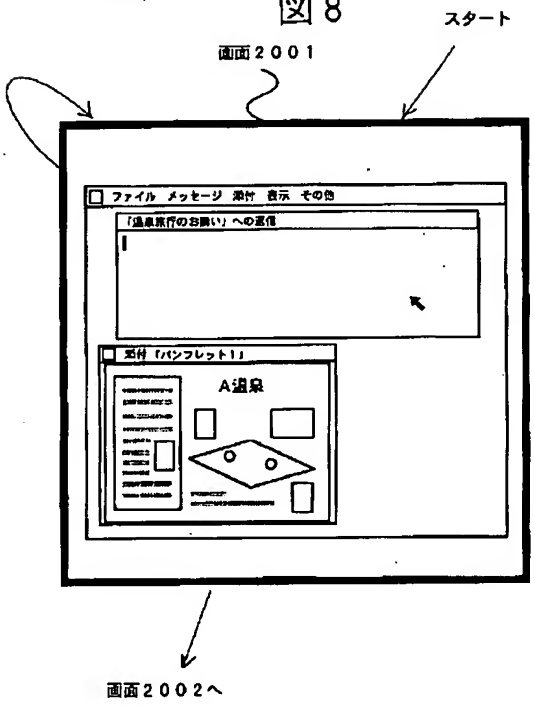
[Drawing 5]

図５



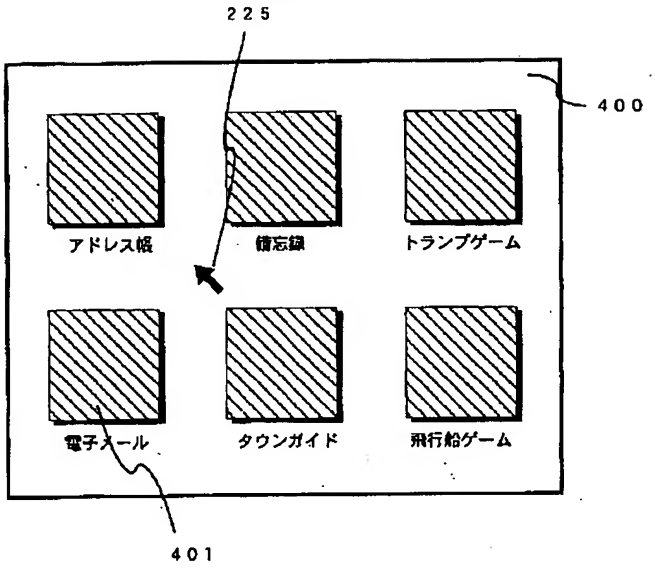
[Drawing 8]

図８



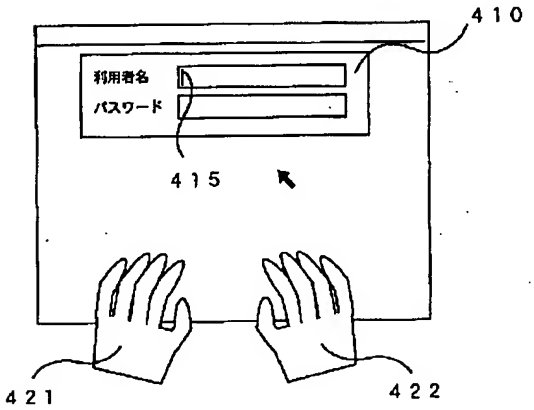
[Drawing 17]

図１７



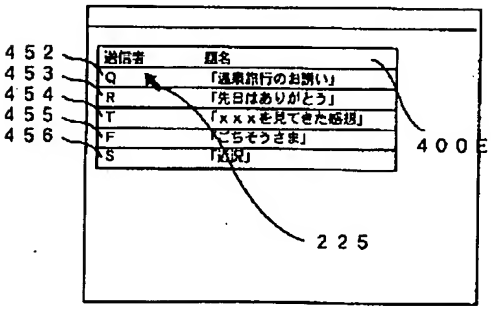
[Drawing 19]

図１９



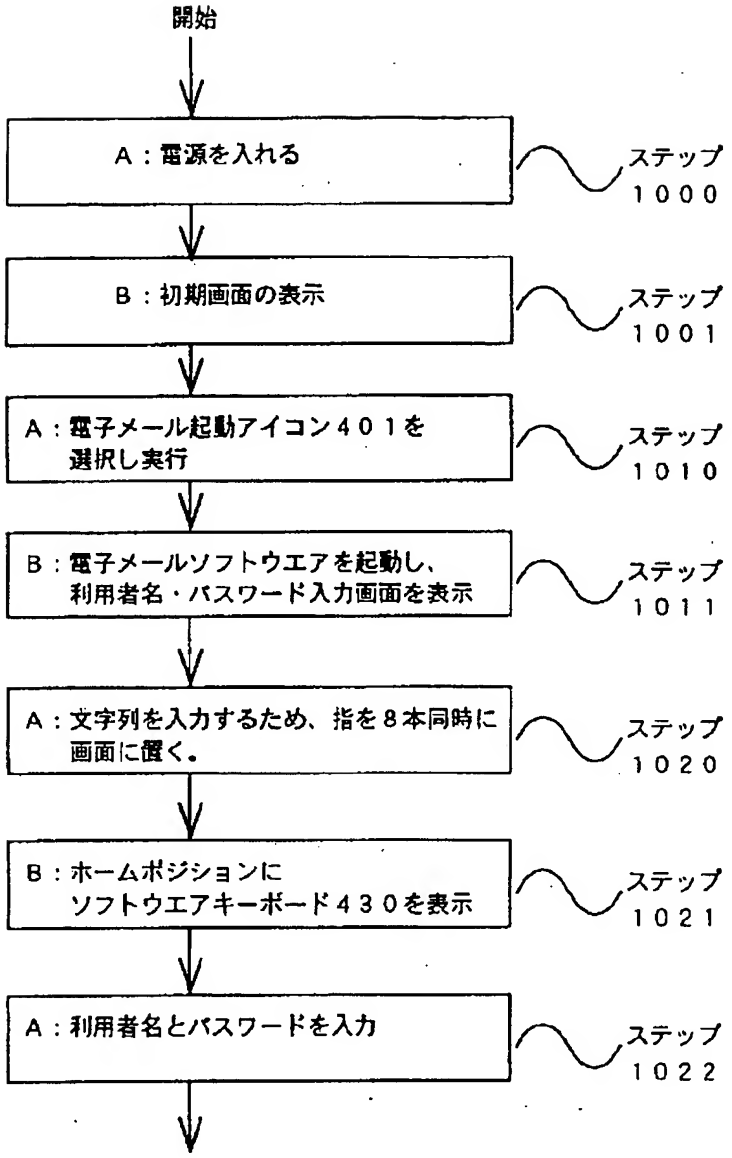
[Drawing 21]

図２１



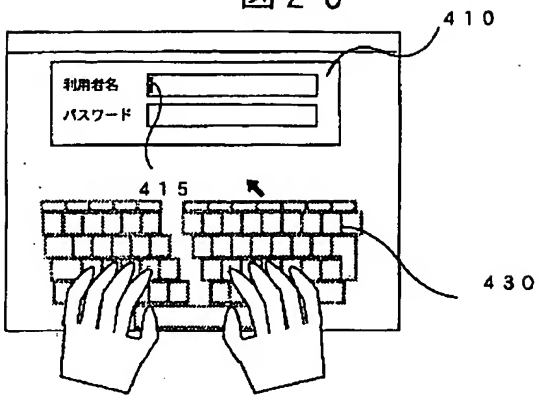
[Drawing 11]

図１１



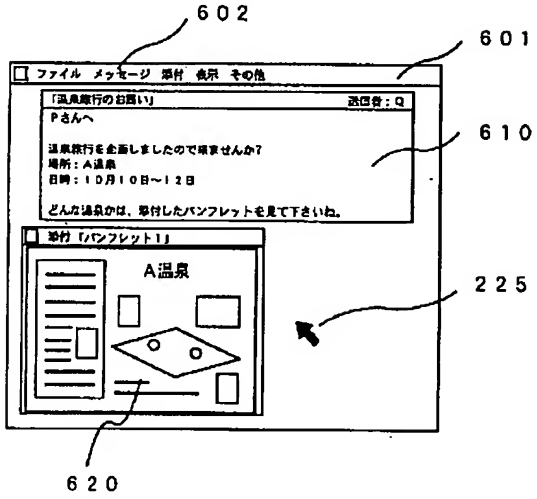
[Drawing 20]

図２０



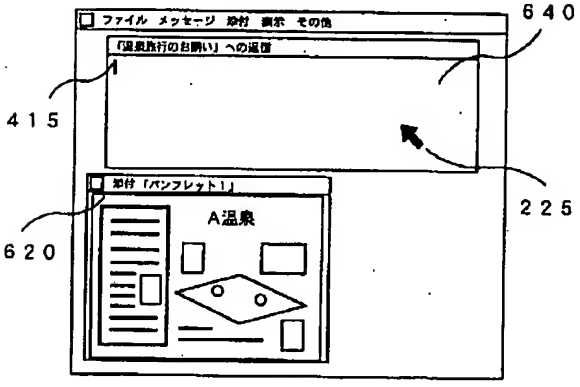
[Drawing 22]

図２２



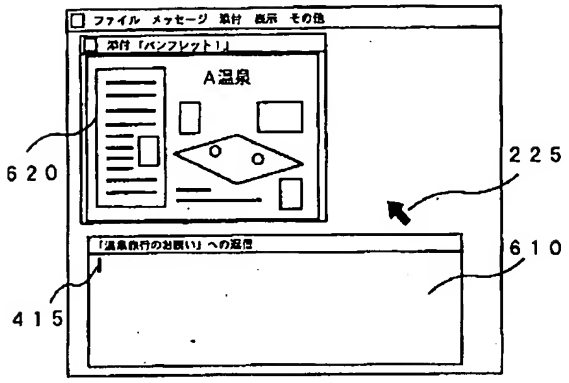
[Drawing 24]

図２４



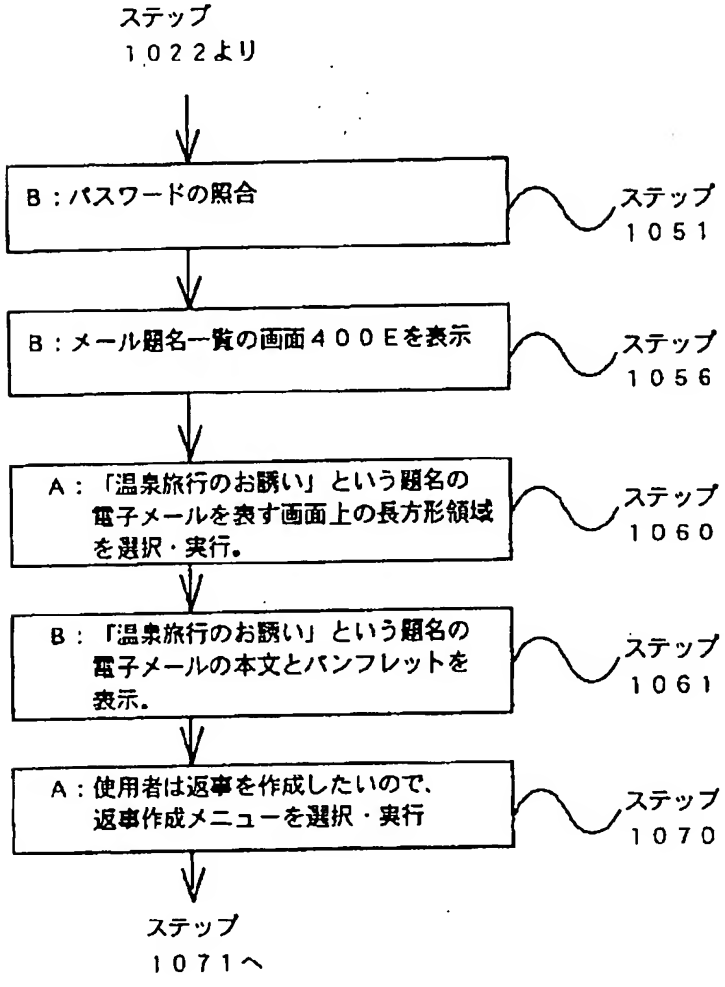
[Drawing 28]

図２８



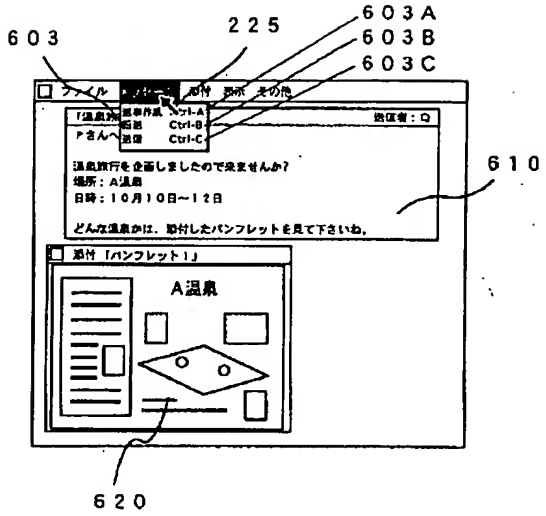
[Drawing 12]

図１２



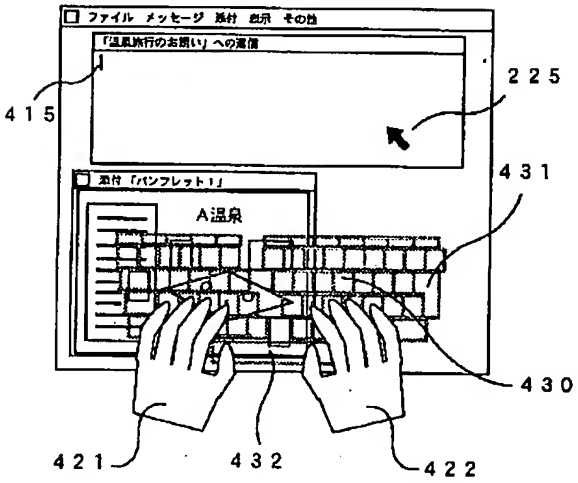
[Drawing 23]

図２３



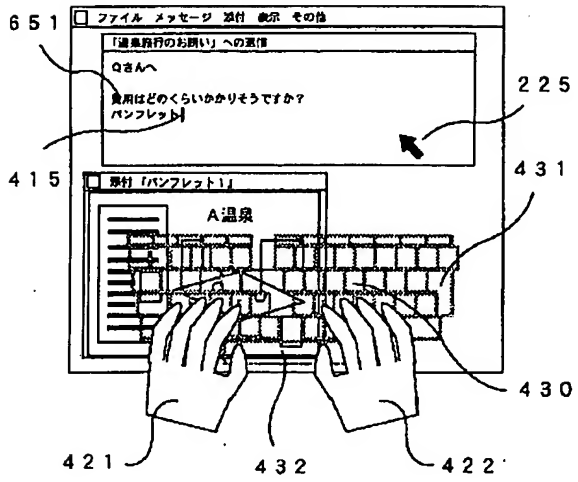
[Drawing 25]

図２５



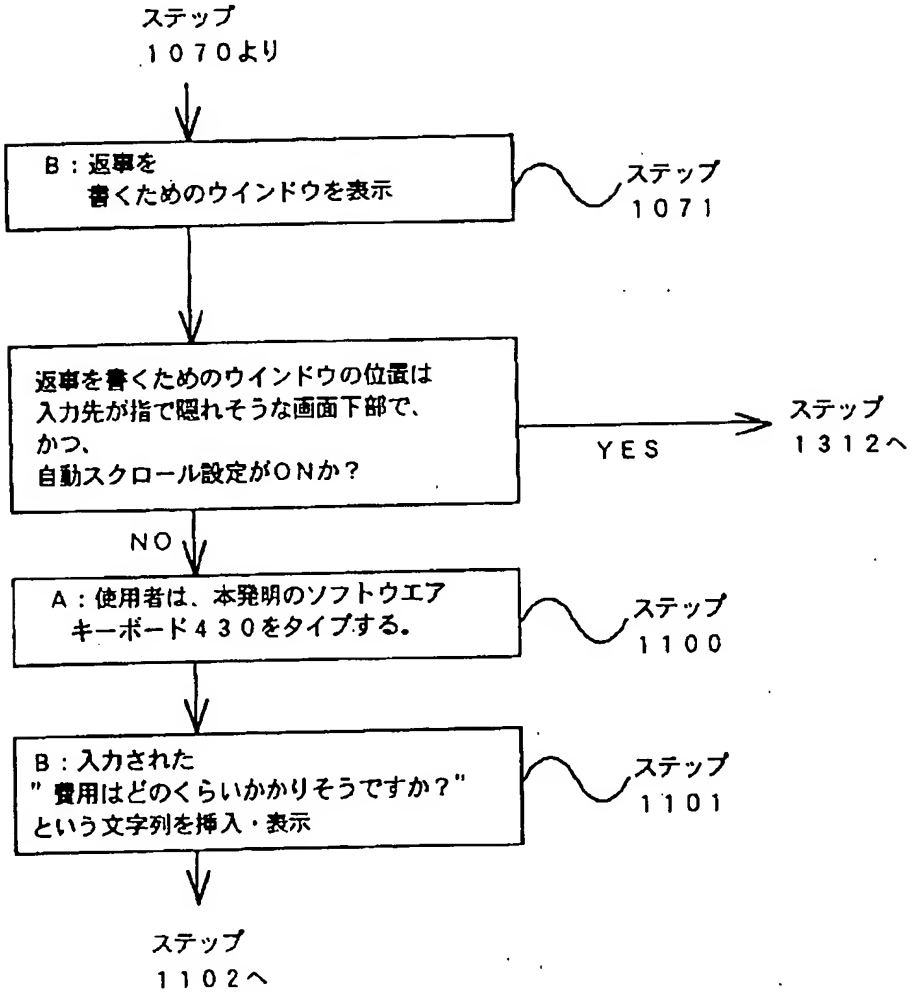
[Drawing 26]

図２６



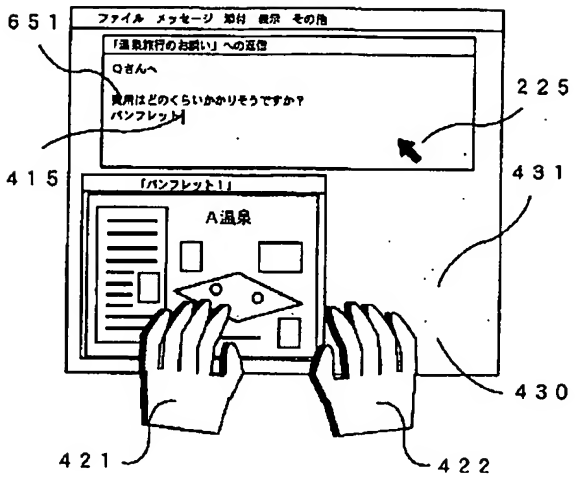
[Drawing 13]

図１３



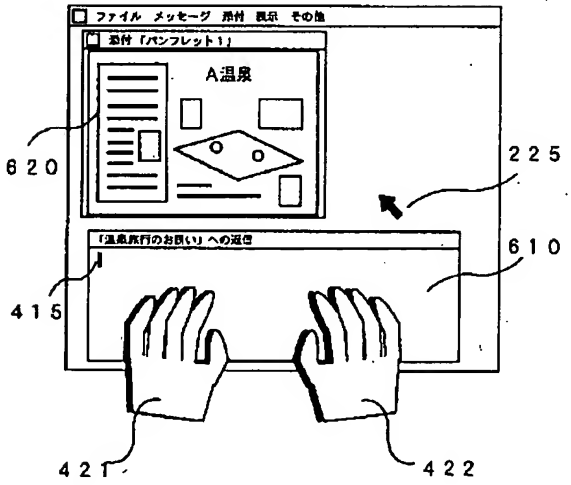
[Drawing 27]

図２７



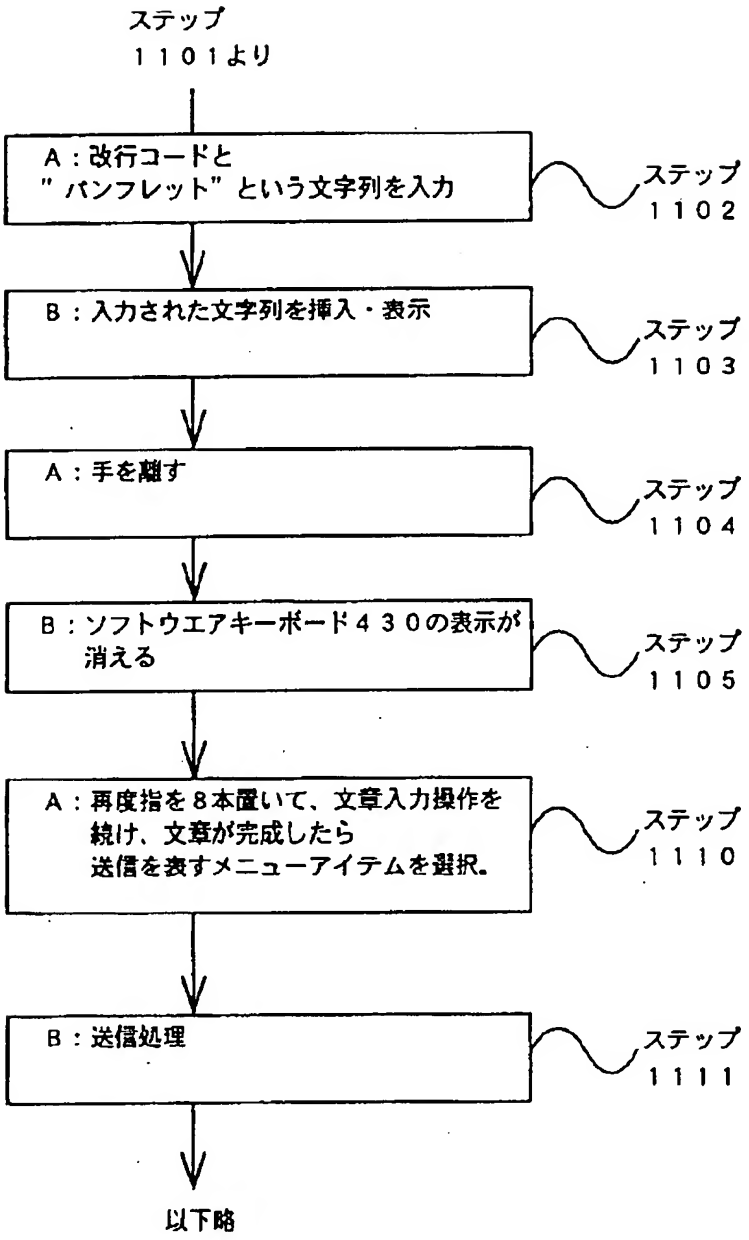
[Drawing 29]

図２９



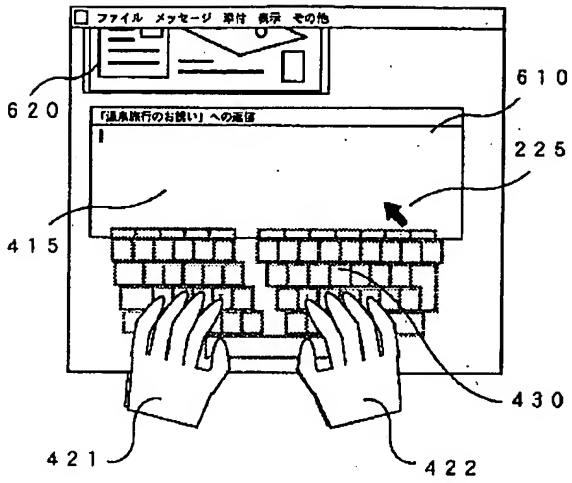
[Drawing 14]

図１４



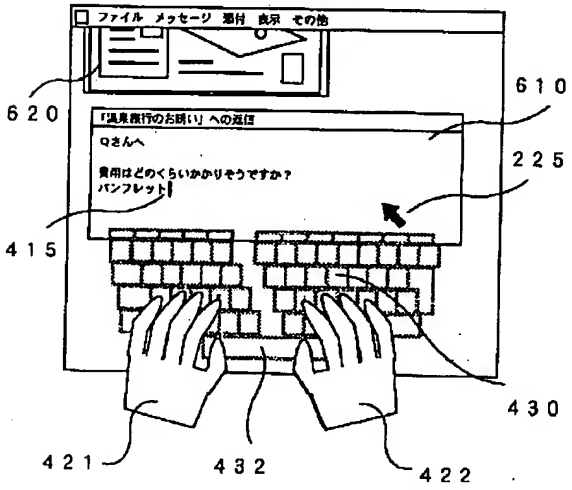
[Drawing 30]

図３０



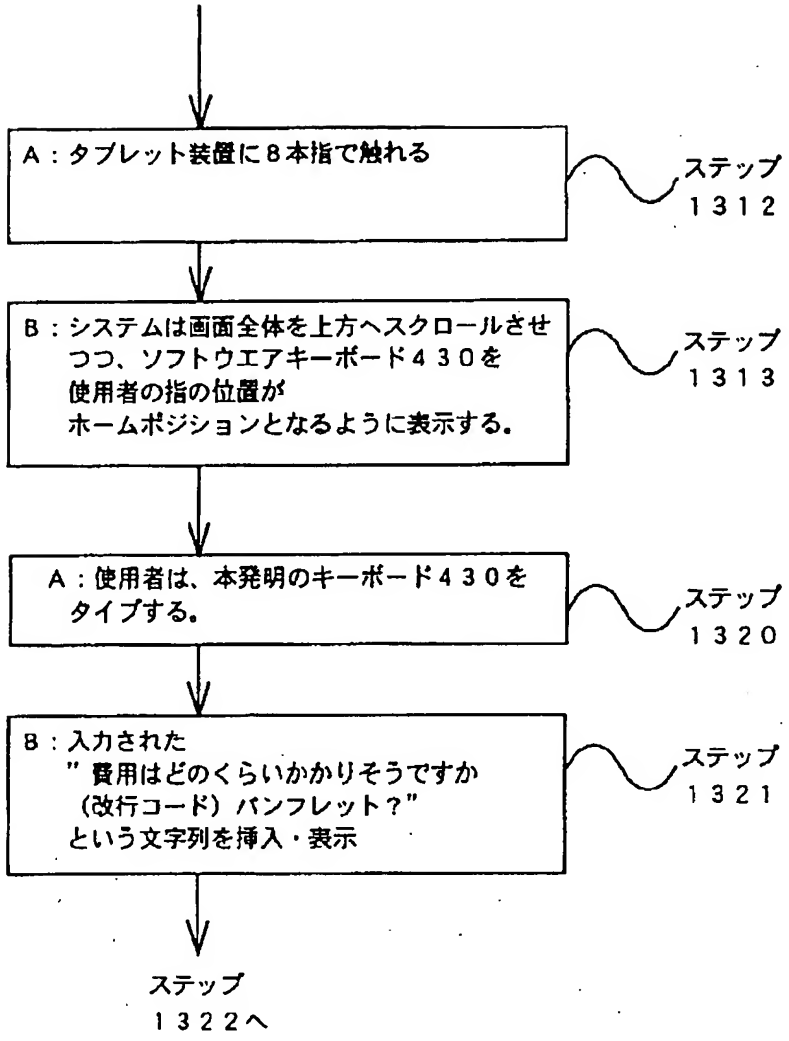
[Drawing 31]

図３１



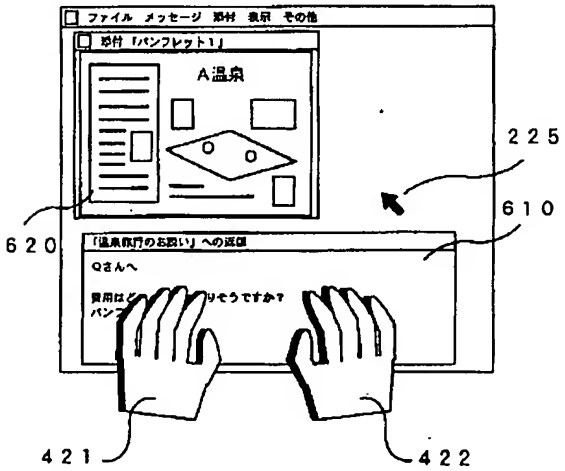
[Drawing 15]

図１５



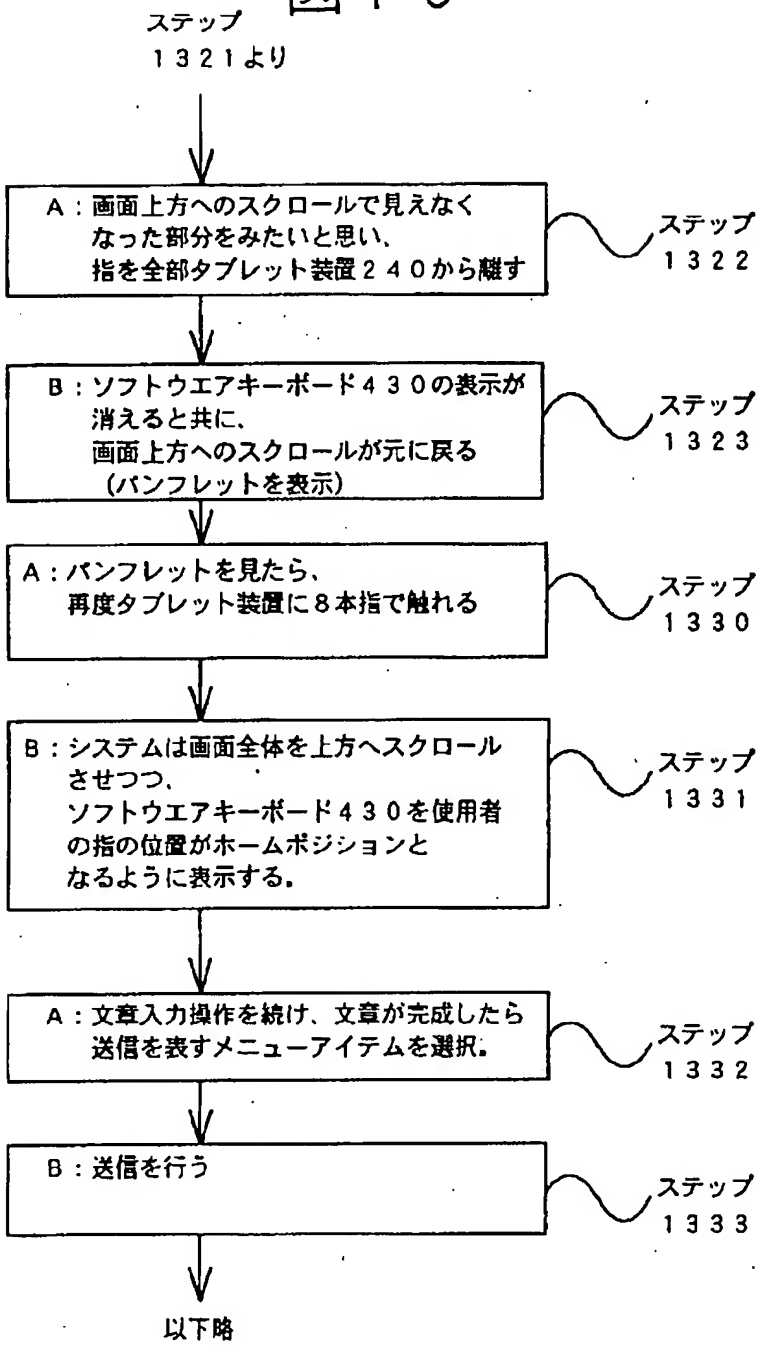
[Drawing 32]

図３２



[Drawing 16]

図１６



DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective view of the information processor in which one example of this invention is shown.
[Drawing 2] It is the block diagram showing the configuration of the information processor of one example of this invention.
[Drawing 3] It is drawing showing further in a detail the block diagram showing the configuration of the information processor of one example of this invention.
[Drawing 4] It is drawing for explaining pressure-distribution detection of one example of this invention.
[Drawing 5] It is drawing for explaining pressure-distribution detection of one example of this invention.
[Drawing 6] It is drawing for explaining pressure-distribution detection of one example of this invention.
[Drawing 7] It is drawing for explaining pressure-distribution detection of one example of this invention.
[Drawing 8] It is a state transition diagram for explaining pressure-distribution detection of one example of this invention.
[Drawing 9] It is a state transition diagram for explaining pressure-distribution detection of one example of this invention.
[Drawing 10] It is a state transition diagram for explaining pressure-distribution detection of one example of this invention.
[Drawing 11] It is drawing showing the actuation flow of one example of this invention.
[Drawing 12] It is drawing showing the actuation flow of one example of this invention.
[Drawing 13] It is drawing showing the actuation flow of one example of this invention.
[Drawing 14] It is drawing showing the actuation flow of one example of this invention.
[Drawing 15] It is drawing showing the actuation flow of one example of this invention.
[Drawing 16] It is drawing showing the actuation flow of one example of this invention.
[Drawing 17] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 18] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 19] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 20] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 21] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 22] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 23] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 24] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 25] It is drawing showing the example of the display screen in one example of this invention.

[Drawing 26] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 27] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 28] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 29] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 30] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 31] It is drawing showing the example of the display screen in one example of this invention.
[Drawing 32] It is drawing showing the example of the display screen in one example of this invention.
[Description of Notations]
200 [-- Power source,] -- This equipment, 201 -- A main frame case, 202 -- A display, 209 210 [-- The control unit of mouse equipment,] -- A power button, 211 -- A clock, 220 -- Mouse equipment, 224 225 [-- Secondary storage,] -- A mouse pointer, 228 -- A pen, 231 -- A central processing unit, 234 240 -- A digitizing tablet, 24C -- The digitizing tablet cut section, 241 -- Digitizing tablet pressure-distribution processing module, 242 -- A **-ed key detecting element, 243 -- An after-treatment module, 244 -- Control unit, 400 -- An initial screen, 400E -- A reception mail title list screen, 401 -- Electronic mail starting icon, 410 -- A user name and a password input window, 415 -- Cursor, 421 -- A user's left hand, 422 -- A user's right hand, 430 -- The virtual keyboard of a QWERTY mold, 431 -- A return key field, 432 -- A space-key field, 452 -- The rectangle region to which a title expresses the electronic mail of "invitation of a hot spring travel", 453 -- The rectangle region to which a title expresses the electronic mail of "the other day is thank you", 454 -- The rectangle region to which a title expresses the electronic mail of "the comment which has seen xxx", 455 -- The rectangle region, 456 to which a title expresses the electronic mail of "thank you" -- The rectangle region to which a title expresses the electronic mail of a "recent state", 550 -- xy axis of coordinates, 551 -- The constant-pressure line of the pressure distribution made by a user's right-hand index finger, 552 -- The enlarged drawing (1) of the constant-pressure line 551, 553 -- Top-most vertices (1), 554 -- The enlarged drawing of the constant-pressure line 551 (2), 555 -- Top-most vertices (2), 556 -- The constant-pressure line, 557 showing P1 -- The constant-pressure line showing P2, 601 -- A menu bar, 602 -- The menu item on which the sub menu about a "message" is displayed, 610 -- The window of the reception mail text, 620 -- The window of the content of a reception mail attachment pamphlet, 225 -- A mouse pointer, 603 -- The sub menu relevant to a "message", 603A -- The menu item, 603B showing answer creation -- The menu item showing a transfer, 603C -- The menu item, 640 showing transmission -- A window for a user to write an answer, 651 -- The character string, 1000 which were inserted -- An actuation step, 1001 -- Actuation step, 1010 -- An actuation step, 1011 -- An actuation step, 1020 -- Actuation step, 1021 -- An actuation step, 1022 -- An actuation step, 1051 -- Actuation step, 1056 -- An actuation step, 1060 -- An actuation step, 1061 -- Actuation step, 1070 -- An actuation step, 1071 -- An actuation step, 1100 -- Actuation step, 1101 -- An actuation step, 1102 -- An actuation step, 1103 --

Actuation step, 1104 -- An actuation step, 1105 -- An actuation step, 1110 -- Actuation step, 1111 -- An actuation step, 1312 -- An actuation step, 1313 -- Actuation step, 1320 -- An actuation step, 1321 -- An actuation step, 1322 -- Actuation step, 1323 [-- An actuation step, 1333 / -- An actuation step, 1601A / -- An input, 2001 / -- A screen, 2002 / -- A screen, 2003 / -- Screen.] -- An actuation step, 1330 -- An actuation step, 1331 -- An actuation step, 1332

MEANS

[Means for Solving the Problem] A pressure detection means for the summary of this invention to detect the pressure concerning (1) display screen, Where the means for displaying the keyboard of the class corresponding to said pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal and said keyboard are displayed based on the detected pressure signal The pressure detection means for detecting the pressure concerning the location corresponding to each key of said keyboard of said display screen, A means to detect the information processor characterized by having a means for processing information based on the pressure signal of each of said detected key, and the pressure concerning (2) display screens to two or more steps according to the magnitude, The means for displaying the keyboard of the class corresponding to the detected pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal, when the magnitude of the detected pressure is in the first pressure range, Where said keyboard is displayed, when the pressure in the second pressure range is detected in the location corresponding to one key of said keyboards The process which detects the information processor characterized by having a means for recognizing that said key was specified, and the pressure concerning (3) display screens, Where the process which displays the keyboard of a predetermined class on the position of said display screen in predetermined size based on the detected pressure signal, and said keyboard are displayed The process which detects the pressure concerning each key of said keyboard displayed on said display screen, The process which detects the pressure concerning the operating instructions of an information processor and (4) display screens which are characterized by having the process which processes information based on the pressure signal of each of said detected key to two or more steps according to the magnitude, The process which displays the keyboard of the class corresponding to the detected pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal when the magnitude of the detected pressure is in the first pressure range, Where said keyboard is displayed, when the pressure in the second pressure range is detected in the location corresponding to one key of said keyboards, it is in the operating instructions of the information processor characterized by having the process which recognizes that said key was specified.

[0009]

[Embodiment of the Invention] Hereafter, the example which transmits an electronic mail by this invention is explained in full detail using drawing 1 - drawing 32 .

[0010] In each drawing, the same sign expresses the same object.

[0011] Drawing in which drawing for the perspective view of the information processor

according [drawing 1] to this example, the block diagram in which drawing 2 shows the configuration of the information processor of this example, drawing 3 - drawing 10 to explain pressure-distribution detection of this example, drawing 11 - drawing 16 show the actuation flow of this example, drawing 17 - drawing 32 are drawings showing the example of the display screen in each phase of actuation of this example.

[0012] In drawing 1 , this equipment 200 has taken the structure which twisted the interior in part, carried out it in the main frame case 201, and covered the whole. The size of equipment is the magnitude which is A4 extent and can be easily carried from B5. Fitting of the display 202 is carried out to the main frame case 201. The digitizing tablet 240 of transparence is laid on the indicating equipment 202. Since a digitizing tablet 240 is transparence, a user can see the content of a display of a display 202 from the exterior of this equipment 200. 24C is the digitizing tablet cut section, is what was prepared for explanation of the digitizing tablet 240 being laid on an indicating equipment 202, and is not cut actually.

[0013] The keyboard (henceforth a "virtual keyboard") 430 displayed on the display screen is for inserting a character string in the location of the cursor 415 displayed on a display 202 in the example of drawing 1 .

[0014] 220 is mouse equipment and 228 is a pen. 421 is on the left of a user, and 422 is a right hand.

[0015] Drawing 2 is the block diagram showing the configuration of the information processor with a tablet with which the virtual keyboard by this example is applied.

[0016] The configuration of this equipment is explained with reference to drawing 2 .

[0017] In drawing 2 , a power source 209 is for supplying power to each part of electronic parts of this equipment, and a power button 210 is for controlling a power source 209. A clock 211 is oscillation equipment for operating each part of this equipment synchronously. A control unit 224 performs required processing to the input signal to mouse equipment 220, and has the function to transmit the signal to a central processing unit 231. An operator can input data by pushing the input screen of a digitizing tablet 240 with a finger, a pen, etc. The digitizing tablet pressure-distribution processing module 241 has the function to receive information, such as display conditions, such as a virtual keyboard on an indicating equipment 202, from a central processing unit 231 while it processes the input signal to a digitizing tablet 240 and sends it to a central processing unit 231. A secondary storage 234 has the function which supplies required data to a central processing unit 231 from the exterior. An indicating equipment 202 is for displaying the data written in the memory for a display in a central processing unit 231 to the equipment exterior.

[0018] Next, detection of the key data in this equipment is explained in full detail using drawing 3 - drawing 10 .

[0019] Drawing 3 is a block diagram for explaining the digitizing tablet pressure-distribution processing module 241 of drawing 2 to a detail. As for a **-ed key detecting element and 243, 242 is [an after-treatment module and 244] control units. Moreover, 240 is a digitizing tablet.

[0020] The digitizing tablet 240 of this equipment is a transparence tabular input unit, and the grid-like grid is arranged. It is possible to detect the pressure concerning all the lattice points simultaneously. The lattice point which detects this pressure is called a pressure-sensitive point.

[0021] From a digitizing tablet 240, the pressure data of all pressure-sensitive points are inputted into the **-ed key detecting element 242 with a fixed time interval.
[0022] The information on the ability to be considered that the **-ed key detecting element 242 is pushed about each key which contains a qualification key and a function key with a fixed time interval is passed to the after-treatment module 243. a ******** [that the **-ed key detecting element 242 updates the location or class of display keyboard etc. with it] -- or it updates -- if it becomes, what kind of keyboard will be displayed on which location of an indicating equipment -- that information is told to a central processing unit 231. There are a QWERTY keyboard, a ten key, etc. as a class of keyboard.
[0023] The after-treatment module 243 looks at the standup of the data of each key received from the **-ed key detecting element 242, falling, etc. Thereby, for each [a qualification key is included] key of every, it detects whether it was pushed newly or it is pushed continuously, and a result is told to a central processing unit 231. Qualification keys are things, such as a control key and a Shift-key.
[0024] When eight fingers except both thumbs are put on a digitizing tablet 240 like drawing 4 , although it is every point with the pressure-sensitive point on a digitizing tablet 240, if the number of the pressure-sensitive point per unit area of a digitizing tablet 240 is fully large, even if it approximates the pressure between a pressure-sensitive point and a pressure-sensitive point with interpolation, it will be convenient [measuring a pressure actually] practical. In this way, the constant-pressure line of the pressure which pushes a digitizing tablet 240 can be considered.
[0025] If the constant-pressure line with the same finger is packed into one set, this set can be likened with the crest as used in the field of a topographic map, when a pressure value is transposed to the height in a topographic map. Hereafter, the set of the constant-pressure line with the same finger may be called a "crest." In the case of drawing 5 , the number of crests is eight. Moreover, the core of the field which can say that a pressure is the highest will be called "top-most vertices" as a result of interpolation of a pressure. Let the consistency of the pressure-sensitive point of a digitizing tablet be a thing large enough.
[0026] In drawing 5 , 551 is the constant-pressure line of the pressure distribution made by a user's right-hand index finger. In the explanation here, toward a digitizing tablet 240, the right sense is made into +x direction, and facing up is made into the direction of +y. The xy axis of coordinates 550 is a thing for this explanation, and is not in actual equipment.
[0027] Drawing 6 is the explanatory view of the constant-pressure line of a pressure with which a finger pushes a digitizing tablet 240, 552 is the enlarged drawing of the constant-pressure line 551 of drawing 5 , and 553 is top-most vertices.
[0028] Drawing 7 is drawing explaining the condition the digitizing tablet 240 "is pushed weakly" with the condition "it is pushed strongly" with each finger. 554 is the enlarged drawing of the constant-pressure line 551 of drawing 5 , and 555 is top-most vertices.
[0029] The pressures P1 and P2 which push a digitizing tablet 240 are made into a constant, and it is referred to as 0<P1<P2. the "key to which the top-most vertices belong if it becomes P1 <=p<=P2 when setting the pressure of top-most vertices to p -- it is pushed weakly" -- giving a definition -- P2<p If it becomes, the key to which the top-most vertices belong will define it as "Being pushed strongly."

[0030] P1 and P2 shall be set up according to an individual according to the value of the x-coordinate of a crest point, when templates, such as the virtual keyboard 430, are not displayed. Thereby, the criteria of "pushing strongly" can also be set up according to an individual with the right middle finger and a right digitus minimus.
[0031] Moreover, when those templates are displayed, it shall set up independently by the key area. A "key area" expresses the field divided by the display of each keytop of a template called the virtual keyboard 430 and ten key of a QWERTY mold here.
[0032] Hereafter, actuation of the **-ed key detecting element 242 is explained using drawing 8 which is a state transition diagram - drawing 10 .
[0033] Screen 2001 expresses the screen condition that the virtual keyboard 430 is not displayed.
[0034] Since Screen 2002 was in the condition of having measured whether the number of a specific crest continuing fixed time but unlike the same time of the condition inside this equipment being Screen 2001 as Screen 2001, it expressed the screen condition as a different node from the condition node of Screen 2001.
[0035] The virtual keyboard 430 of a QWERTY mold is displayed and Screen 2003 expresses the screen condition that the input of a keycode is attained.
[0036] The **-ed key detecting element 242 operates synchronizing with a digitizing tablet 240. That is, there shall be an input from a digitizing tablet 240 to the **-ed key detecting element 242 for every fixed time amount, and the state transition of drawing 8 - drawing 10 shall happen once over the fixed time amount.
[0037] A user can display at least two kinds of templates in this equipment. One is the virtual keyboard 430 of a QWERTY mold, and another is a virtual ten key.
[0038] In Screen 2001, an input of call actuation of either of two kinds of a degree displays the virtual keyboard 430 or virtual ten key of a QWERTY mold.
[0039] The call actuation on which the virtual keyboard 430 of a QWERTY mold is displayed fills following condition (1) - (4) altogether.
[0040] (1) It is in the condition that this equipment shows neither the virtual keyboard 430 of a QWERTY mold, nor a virtual ten key.
[0041] (2) The condition of having been weakly pushed with eight fingers should continue beyond fixed time amount. The number of a crest is 8 and the condition of having been weakly pushed with eight fingers here is that the pressure p of top-most vertices fills P1 <=p<=P2 about all the crests whose number is eight.
[0042] (3) Crest point x Four points should be "spacing like finger spacing on about 1 straight line" from the smaller one of a coordinate. Here, an "about 1 straight-line top" is less than 8mm, for example about all the four points in the distance from the straight line by the least square method of four points. Moreover, "spacing like finger spacing" is 19 to 22mm in spacing of the crest points which adjoin each other, for example.
[0043] (4) Crest point x Four points should be "spacing like finger spacing on about 1 straight line" from the larger one of a coordinate.
[0044] Hereafter, this is called virtual keyboard call actuation of a QWERTY mold.
[0045] The call actuation on which a virtual ten key is displayed fills following condition (1) - (3) altogether.
[0046] (1) It is in the condition that this equipment shows neither the virtual keyboard 430 of a QWERTY mold, nor a virtual ten key.
[0047] (2) The condition of having been weakly pushed with three fingers should

continue beyond fixed time amount. The pressure p of top-most vertices should fill P1 <=p<=P2 about all the crests whose number the number of a crest of the condition of having been weakly pushed with three fingers here is 3, and is three.
[0048] (3) Three crest points should be "spacing like finger spacing on about 1 straight line." Here, an "about 1 straight-line top" is less than 8mm, for example about all the three points in the distance from the straight line by the least square method from three points. Moreover, "spacing like finger spacing" is 19 to 22mm in spacing of the crest points which adjoin each other, for example.
[0049] Hereafter, this is called ten key call actuation.
[0050] A user is able to use those templates by matching templates other than the virtual keyboard 430 of a QWERTY mold, or a virtual ten key with the call actuation for displaying them, and preparing them beforehand.
[0051] It is not necessary to necessarily learn the call actuation in that case from the above-mentioned example that what is necessary is just appropriately.
[0052] For example, if the digitizing tablet 240 is touched [five] beyond fixed time amount, it is possible to display the template of a order-of-the-Japanese-syllabary array etc.
[0053] In Screen 2001, if virtual keyboard call actuation of a QWERTY mold is inputted, it will change to Screen 2003 and the virtual keyboard 430 of a QWERTY mold will be displayed.
[0054] Moreover, in Screen 2001, if virtual ten key call actuation is inputted, it will change to Screen 2003 and a ten key will be displayed.
[0055] Below, actuation of the **-ed key detecting element 242 is gradually explained according to transition of a condition.
[0056] First, a variable called N used in the following explanation is explained.
[0057] When setting to p the number of the finger pushed strongly, i.e., the pressure of top-most vertices, the number of top-most vertices which fills P2<p is set with N.
[0058] The display of a template will be eliminated, if the number of the finger which is pushing the digitizing tablet by the pressure beyond P1 is set to 0 when some templates, such as the virtual keyboard 430 of a QWERTY mold, are displayed on the indicating equipment.
[0059] This condition is in an initiation condition and Screen 2001 of drawing 8 is equivalent to this condition.
[0060] The input which a digitizing tablet is weakly pushed with 3 or eight fingers, and fills (3) of software keyboard call actuation and (4) is set to input 1601A.
[0061] In the condition of Screen 2001, when input 1601A is inputted, this equipment starts the measurement for investigating whether the number of the crest in input 1601A continues fixed time, and changes to the condition of Screen 2002. Fixed time amount is for example, 200 mses.
[0062] In the condition of Screen 2001, when the input of those other than input 1601A is carried out, while telling that the **-ed key detecting element 242 does not have the key strongly pushed on the after-treatment module 243 with the finger for convenience, it tells a central processing unit 231 that it does not make it change with the display of a template erased. And a condition is still Screen 2001.
[0063] An "expedient top" is because the key area pushed strongly actually may exist here.

[0064] For example, when the actuation "four the digitizing tablet is touched beyond fixed time amount" is not defined as actuation of calling a certain template, suppose it that equipment was pushed by the pressure beyond P1 with four fingers, and was pushed by the pressure beyond P2 by at least one of push and 4.
[0065] In this case, although the key pressed by the pressure beyond P2 exists, I hear that it is told for convenience to the after-treatment module 243 that there is such no key, and it is.
[0066] In the condition of Screen 2002, with the number of the crest in input 1601A And if all the fingers are 8 about a ten key when it continues fixed time in the condition of pushing the digitizing tablet weakly, and the number of a crest is 3, they will display the virtual keyboard 430 of a QWERTY mold. While changing to the condition of a screen display 2003, it tells that the top-most vertices used as P2<p are included, namely, there is no key area pushed strongly to the after-treatment module 243.
[0067] In the condition of Screen 2002, the measurement for investigating whether the number of the crest in input 1601A continues fixed time, when top-most vertices are pushed [no] weakly and it has passed fixed time is continued with the number of the crest in input 1601A, and it remains in the condition of Screen 2002.
[0068] In the condition of Screen 2002, when the number of a crest which is pushing the digitizing tablet weakly differs from the number of the crest in input 1601A before passing fixed time, the measurement for investigating whether the number of the crest in input 1601A continues fixed time is canceled, and it changes in the condition of Screen 2001.
[0069] There are the following three kinds in Screen 2003.
[0070] (1) The number of a crest is one or more, and at the time of the input of N= 0, while telling that the **-ed key detecting element 242 does not have the key strongly pressed with the finger to the after-treatment module 243, tell a central processing unit 231 that the display of a template is not changed. And a condition is still Screen 2003.
[0071] (2) The number of a crest is one or more, and at the time of the input of N> 0, the **-ed key detecting element 242 tells a central processing unit 231 that it does not change the display of a template while telling all the key areas strongly pushed with the finger to the after-treatment module 243. And a condition is still Screen 2003.
[0072] (3) When the number of a crest is 0, in the input none of whose fingers is pushing the digitizing tablet 240 by the pressure beyond P1, tell a central processing unit 231 that a template is not displayed while telling that there is no key strongly pressed by the **-ed key detecting element 242 with a finger to the after-treatment module 243. And a condition changes to Screen 2001.
[0073] Next, it explains in full detail per example of actuation of an information processor based on this invention using drawing 11 - drawing 32 .
[0074] Drawing 11 - drawing 16 are drawings showing the actuation flow of the information processor by this example.
[0075] In drawing 11 - drawing 16 , the part to which the part following "A:" follows "B:" in an intention of a user and the input to the equipment by the user shall express the reaction of the equipment to a user's input etc.
[0076] Steps 1000-1010 are explained.
[0077] A user pushes the power button 210 shown in drawing 2 , and he starts this equipment while he changes the power of a power source 209 into the condition which

can be supplied to each part of electronic parts of this equipment. Then, this equipment displays the initial screen 400 as shown in a display at drawing 17 .

[0078] The example which reads an electronic mail is explained. A user performs actuation or equivalent actuation of a mouse pointer 225 using mouse equipment 220 or the same pointing equipment (it is hereafter called mouse equipment 220 grade), and chooses and performs the electronic mail starting icon 401.

[0079] Step 1011 is explained. This equipment starts e-mail software wear, displays a user name and the password input window 410 as shown in drawing 18 on a display, and urges the input of a user name etc. to the location of cursor 415 to a user.

[0080] Step 1020 is explained. A user wants to input the character string showing a user name. As shown in drawing 19 , a user places eight fingers except the thumb among ten fingers a user's left hand 421 and on the right of [422] a user like [when putting a hand on either side on the usual keyboard currently used for the general present], where index fingers on either side are fully detached. When it displays afterwards the virtual keyboard of a QWERTY mold "fully detaches", it is the semantics of while detaching only the distance which the part for the left hands of the virtual keyboard of a QWERTY mold and the part for right hands do not overlap here. About the virtual keyboard of a QWERTY mold, it mentions later.

[0081] Step 1021 is explained. This equipment judges that eight fingers were put on the digitizing tablet 240, and as shown in drawing 20 , it displays the virtual keyboard 430 of the QWERTY mold of the key pitch suitable for the user's finger on the location where the location which the right hand 421 and left hand 422 on a digitizing tablet set serves as a home position as it is.

[0082] It is the thing of how to place the finger with which in the case of the keyboard of a QWERTY mold the left index finger serves as a home position, and the location of the F key and the right index finger serve as a location of the J key.

[0083] According to this example, a user can make a home position the location which placed the hand on the indicating equipment as it is. For this reason, it is not necessary to move a look to a part for the display of the virtual keyboard 430 of a QWERTY mold, and to move a finger for the adjustment which doubles the location of a finger with the location of a home position. That is, a user can use the virtual keyboard 430 of a QWERTY mold, without separating a look from the insertion point of a character string. Therefore, visual fatigue of a user can be decreased and the operate time of the part which adjusts the location of a finger or moves a view further can be shortened.

[0084] Moreover, key pitch is the distance of the center to center of two keys of the arbitration which adjoined each other and was located in a line with the longitudinal direction.

[0085] Since the gestalt of fingers including a size changes with individuals, as for the key pitch of a keyboard, it is desirable that it is adjustable.

[0086] Or it registered suitable key pitch beforehand for every the (user) in the case of the conventional virtual keyboard, it needed to be operated that a user performs a certain actuation clearly and adjusts it using (2) control panels etc.

[0087] However, since this equipment determines the key pitch which suited the user based on the distance of the fingers which contact to a digitizing tablet 240, assignment of key pitch can perform it directly and automatically.

[0088] Furthermore, it is thought that the distance of the adjacent fingers in the condition

of having opened the finger automatically differs for every finger since the sizes of a finger differ for every finger. This equipment can also offer the virtual keyboard 430 which doubled key pitch with spacing of each adjacent finger automatically. An impossible motion of a finger can be mitigated by this and a physical burden can be reduced.
[0089]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, as compared with the input according [the input with the above-mentioned pen etc.] to a keyboard, input effectiveness falls remarkably. It is for having to see and discover the alphabetic character which should be inputted by the eye out of the alphabetic character group displayed on the screen for every single character, having to move a nib there, and having to touch a screen. Moreover, handwriting actuation and the character recognition by equipment take much time amount to making equipment recognize the alphabetic character by writing an alphabetic character by hand with a pen on a screen.
[0006] Moreover, since it is thought that the approach of digitizing the information regarded as an image which is indicated by above-mentioned JP,6-083512,A is difficult to acquire a high precision, it is difficult to input an alphabetic character etc. efficiently. In addition, it is not indicated about inputting an alphabetic character etc. into above-mentioned JP,6-083512,A by touching the keyboard displayed on the screen.
[0007] The object of this invention is to offer an information processor with sufficient input effectiveness, and its operating instructions, though it is a small thin shape. That is, also in equipment without a mechanical keyboard, when there is it, it is in offering the information processor which can input an alphabetic character etc., and its operating instructions at the effectiveness more than an EQC.

EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, with the virtual keyboard displayed on the display screen of an information processor, as stated above, since actuation of the input of a character string etc. can be performed, thin lightweight-ization of equipment can be realized and an alphabetic character etc. can be inputted efficiently.

PRIOR ART

[Description of the Prior Art] In order to have inputted the character string etc. into the computer etc. conventionally, it was common to have used a built-in mechanical keyboard.

[0003] However, recently, it is in the inclination for equipment to be formed into small lightweight for [for the facilities of a cellular phone] occupancy tooth-space reduction. For this reason, the information processor without a mechanical keyboard is developed. With such equipment, the approach of inputting a character string etc. is taken by touching with a pen etc. the screen equipped with a means to, sense that the top face and underside of a screen contacted for example. That is, by touching and choosing with a pen the predetermined alphabetic character in the alphabetic character group displayed on the screen, by inputting a character string or writing an alphabetic character by hand with a pen on a screen, equipment is made to recognize the alphabetic character and a character string is inputted into it.

[0004] Moreover, to above-mentioned JP,6-083512,A, a motion of the hand and finger of a desk which can be set good is caught with a camera, and it is indicated about inputting an alphabetic character etc. by digitizing caught ******.

TECHNICAL FIELD

[Field of the Invention] This invention relates to information processors, such as a computer and a word processor. It is related with the information processor for performing an input efficiently, and its operating instructions, attaining small lightweight-ization especially.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to information processors, such as a computer and a word processor. It is related with the information processor for performing an input efficiently, and its operating instructions, attaining small lightweight-ization especially.

[0002]

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a pen on a screen, equipment is made to recognize the alphabetic character and a character string is inputted into it.

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[0005]

[Problem(s) to be Solved by the Invention] However, as compared with the input according [the input with the above-mentioned pen etc.] to a keyboard, input effectiveness falls remarkably. It is for having to see and discover the alphabetic character which should be inputted by the eye out of the alphabetic character group displayed on the screen for every single character, having to move a nib there, and having to touch a screen. Moreover, handwriting actuation and the character recognition by equipment take much time amount to making equipment recognize the alphabetic character by writing an alphabetic character by hand with a pen on a screen.

[0006] Moreover, since it is thought that the approach of digitizing the information regarded as an image which is indicated by above-mentioned JP,6-083512,A is difficult to acquire a high precision, it is difficult to input an alphabetic character etc. efficiently. In addition, it is not indicated about inputting an alphabetic character etc. into above-mentioned JP,6-083512,A by touching the keyboard displayed on the screen.

[0007] The object of this invention is to offer an information processor with sufficient input effectiveness, and its operating instructions, though it is a small thin shape. That is, also in equipment without a mechanical keyboard, when there is it, it is in offering the information processor which can input an alphabetic character etc., and its operating instructions at the effectiveness more than an EQC.

[0008]

[Means for Solving the Problem] A pressure detection means for the summary of this invention to detect the pressure concerning (1) display screen, Where the means for displaying the keyboard of the class corresponding to said pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal and said keyboard are displayed based on the detected pressure signal The pressure detection means for detecting the pressure concerning the location corresponding to each key of said keyboard of said display screen, A means to detect the information processor characterized by having a means for processing information based on the pressure signal of each of said detected key, and the pressure concerning (2) display screens to two or more steps according to the magnitude, The means for displaying the keyboard of the class corresponding to the detected pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal, when the magnitude of the detected pressure is in the first pressure range, Where said keyboard is displayed, when the pressure in the second pressure range is detected in the location corresponding to one key of said keyboards The process which detects the information processor characterized by having a means for recognizing that said key was specified, and the pressure concerning (3) display screens, Where the process which displays the keyboard of a predetermined class on the position of said display screen in predetermined size based on the detected pressure signal, and said keyboard are displayed The process which detects the pressure concerning each key of said keyboard displayed on said display screen, The process

which detects the pressure concerning the operating instructions of an information processor and (4) display screens which are characterized by having the process which processes information based on the pressure signal of each of said detected key to two or more steps according to the magnitude, The process which displays the keyboard of the class corresponding to the detected pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal when the magnitude of the detected pressure is in the first pressure range, Where said keyboard is displayed, when the pressure in the second pressure range is detected in the location corresponding to one key of said keyboards, it is in the operating instructions of the information processor characterized by having the process which recognizes that said key was specified.

[0009]

[Embodiment of the Invention] Hereafter, the example which transmits an electronic mail by this invention is explained in full detail using drawing 1 - drawing 32 .

[0010] In each drawing, the same sign expresses the same object.

[0011] Drawing in which drawing for the perspective view of the information processor according [drawing 1] to this example, the block diagram in which drawing 2 shows the configuration of the information processor of this example, drawing 3 - drawing 10 to explain pressure-distribution detection of this example, drawing 11 - drawing 16 show the actuation flow of this example, drawing 17 - drawing 32 are drawings showing the example of the display screen in each phase of actuation of this example.

[0012] In drawing 1 , this equipment 200 has taken the structure which twisted the interior in part, carried out it in the main frame case 201, and covered the whole. The size of equipment is the magnitude which is A4 extent and can be easily carried from B5. Fitting of the display 202 is carried out to the main frame case 201. The digitizing tablet 240 of transparence is laid on the indicating equipment 202. Since a digitizing tablet 240 is transparence, a user can see the content of a display of a display 202 from the exterior of this equipment 200. 24C is the digitizing tablet cut section, is what was prepared for explanation of the digitizing tablet 240 being laid on an indicating equipment 202, and is not cut actually.

[0013] The keyboard (henceforth a "virtual keyboard") 430 displayed on the display screen is for inserting a character string in the location of the cursor 415 displayed on a display 202 in the example of drawing 1 .

[0014] 220 is mouse equipment and 228 is a pen. 421 is on the left of a user, and 422 is a right hand.

[0015] Drawing 2 is the block diagram showing the configuration of the information processor with a tablet with which the virtual keyboard by this example is applied.

[0016] The configuration of this equipment is explained with reference to drawing 2 .

[0017] In drawing 2 , a power source 209 is for supplying power to each part of electronic parts of this equipment, and a power button 210 is for controlling a power source 209. A clock 211 is oscillation equipment for operating each part of this equipment synchronously. A control unit 224 performs required processing to the input signal to mouse equipment 220, and has the function to transmit the signal to a central processing unit 231. An operator can input data by pushing the input screen of a digitizing tablet 240 with a finger, a pen, etc. The digitizing tablet pressure-distribution processing module 241 has the function to receive information, such as display

conditions, such as a virtual keyboard on an indicating equipment 202, from a central processing unit 231 while it processes the input signal to a digitizing tablet 240 and sends it to a central processing unit 231. A secondary storage 234 has the function which supplies required data to a central processing unit 231 from the exterior. An indicating equipment 202 is for displaying the data written in the memory for a display in a central processing unit 231 to the equipment exterior.

[0018] Next, detection of the key data in this equipment is explained in full detail using drawing 3 - drawing 10 .

[0019] Drawing 3 is a block diagram for explaining the digitizing tablet pressure-distribution processing module 241 of drawing 2 to a detail. As for a **-ed key detecting element and 243, 242 is [an after-treatment module and 244] control units. Moreover, 240 is a digitizing tablet.

[0020] The digitizing tablet 240 of this equipment is a transparence tabular input unit, and the grid-like grid is arranged. It is possible to detect the pressure concerning all the lattice points simultaneously. The lattice point which detects this pressure is called a pressure-sensitive point.

[0021] From a digitizing tablet 240, the pressure data of all pressure-sensitive points are inputted into the **-ed key detecting element 242 with a fixed time interval.

[0022] The information on the ability to be considered that the **-ed key detecting element 242 is pushed about each key which contains a qualification key and a function key with a fixed time interval is passed to the after-treatment module 243. a ******** [that the **-ed key detecting element 242 updates the location or class of display keyboard etc. with it] -- or it updates -- if it becomes, what kind of keyboard will be displayed on which location of an indicating equipment -- that information is told to a central processing unit 231. There are a QWERTY keyboard, a ten key, etc. as a class of keyboard.

[0023] The after-treatment module 243 looks at the standup of the data of each key received from the **-ed key detecting element 242, falling, etc. Thereby, for each [a qualification key is included] key of every, it detects whether it was pushed newly or it is pushed continuously, and a result is told to a central processing unit 231. Qualification keys are things, such as a control key and a Shift-key.

[0024] When eight fingers except both thumbs are put on a digitizing tablet 240 like drawing 4 , although it is every point with the pressure-sensitive point on a digitizing tablet 240, if the number of the pressure-sensitive point per unit area of a digitizing tablet 240 is fully large, even if it approximates the pressure between a pressure-sensitive point and a pressure-sensitive point with interpolation, it will be convenient [measuring a pressure actually] practical. In this way, the constant-pressure line of the pressure which pushes a digitizing tablet 240 can be considered.

[0025] If the constant-pressure line with the same finger is packed into one set, this set can be likened with the crest as used in the field of a topographic map, when a pressure value is transposed to the height in a topographic map. Hereafter, the set of the constant-pressure line with the same finger may be called a "crest." In the case of drawing 5 , the number of crests is eight. Moreover, the core of the field which can say that a pressure is the highest will be called "top-most vertices" as a result of interpolation of a pressure. Let the consistency of the pressure-sensitive point of a digitizing tablet be a thing large enough.

[0026] In drawing 5 , 551 is the constant-pressure line of the pressure distribution made by a user's right-hand index finger. In the explanation here, toward a digitizing tablet 240, the right sense is made into +x direction, and facing up is made into the direction of +y. The xy axis of coordinates 550 is a thing for this explanation, and is not in actual equipment.
[0027] Drawing 6 is the explanatory view of the constant-pressure line of a pressure with which a finger pushes a digitizing tablet 240, 552 is the enlarged drawing of the constant-pressure line 551 of drawing 5 , and 553 is top-most vertices.
[0028] Drawing 7 is drawing explaining the condition the digitizing tablet 240 "is pushed weakly" with the condition "it is pushed strongly" with each finger. 554 is the enlarged drawing of the constant-pressure line 551 of drawing 5 , and 555 is top-most vertices.
[0029] The pressures P1 and P2 which push a digitizing tablet 240 are made into a constant, and it is referred to as 0<P1<P2. the "key to which the top-most vertices belong if it becomes P1 <=p<=P2 when setting the pressure of top-most vertices to p -- it is pushed weakly" -- giving a definition -- P2<p If it becomes, the key to which the top-most vertices belong will define it as "Being pushed strongly."
[0030] P1 and P2 shall be set up according to an individual according to the value of the x-coordinate of a crest point, when templates, such as the virtual keyboard 430, are not displayed. Thereby, the criteria of "pushing strongly" can also be set up according to an individual with the right middle finger and a right digitus minimus.
[0031] Moreover, when those templates are displayed, it shall set up independently by the key area. A "key area" expresses the field divided by the display of each keytop of a template called the virtual keyboard 430 and ten key of a QWERTY mold here.
[0032] Hereafter, actuation of the **-ed key detecting element 242 is explained using drawing 8 which is a state transition diagram - drawing 10 .
[0033] Screen 2001 expresses the screen condition that the virtual keyboard 430 is not displayed.
[0034] Since Screen 2002 was in the condition of having measured whether the number of a specific crest continuing fixed time but unlike the same time of the condition inside this equipment being Screen 2001 as Screen 2001, it expressed the screen condition as a different node from the condition node of Screen 2001.
[0035] The virtual keyboard 430 of a QWERTY mold is displayed and Screen 2003 expresses the screen condition that the input of a keycode is attained.
[0036] The **-ed key detecting element 242 operates synchronizing with a digitizing tablet 240. That is, there shall be an input from a digitizing tablet 240 to the **-ed key detecting element 242 for every fixed time amount, and the state transition of drawing 8 - drawing 10 shall happen once over the fixed time amount.
[0037] A user can display at least two kinds of templates in this equipment. One is the virtual keyboard 430 of a QWERTY mold, and another is a virtual ten key.
[0038] In Screen 2001, an input of call actuation of either of two kinds of a degree displays the virtual keyboard 430 or virtual ten key of a QWERTY mold.
[0039] The call actuation on which the virtual keyboard 430 of a QWERTY mold is displayed fills following condition (1) - (4) altogether.
[0040] (1) It is in the condition that this equipment shows neither the virtual keyboard 430 of a QWERTY mold, nor a virtual ten key.
[0041] (2) The condition of having been weakly pushed with eight fingers should

continue beyond fixed time amount. The number of a crest is 8 and the condition of having been weakly pushed with eight fingers here is that the pressure p of top-most vertices fills P1 <=p<=P2 about all the crests whose number is eight.
[0042] (3) Crest point x Four points should be "spacing like finger spacing on about 1 straight line" from the smaller one of a coordinate. Here, an "about 1 straight-line top" is less than 8mm, for example about all the four points in the distance from the straight line by the least square method of four points. Moreover, "spacing like finger spacing" is 19 to 22mm in spacing of the crest points which adjoin each other, for example.
[0043] (4) Crest point x Four points should be "spacing like finger spacing on about 1 straight line" from the larger one of a coordinate.
[0044] Hereafter, this is called virtual keyboard call actuation of a QWERTY mold.
[0045] The call actuation on which a virtual ten key is displayed fills following condition (1) - (3) altogether.
[0046] (1) It is in the condition that this equipment shows neither the virtual keyboard 430 of a QWERTY mold, nor a virtual ten key.
[0047] (2) The condition of having been weakly pushed with three fingers should continue beyond fixed time amount. The pressure p of top-most vertices should fill P1 <=p<=P2 about all the crests whose number the number of a crest of the condition of having been weakly pushed with three fingers here is 3, and is three.
[0048] (3) Three crest points should be "spacing like finger spacing on about 1 straight line." Here, an "about 1 straight-line top" is less than 8mm, for example about all the three points in the distance from the straight line by the least square method from three points. Moreover, "spacing like finger spacing" is 19 to 22mm in spacing of the crest points which adjoin each other, for example.
[0049] Hereafter, this is called ten key call actuation.
[0050] A user is able to use those templates by matching templates other than the virtual keyboard 430 of a QWERTY mold, or a virtual ten key with the call actuation for displaying them, and preparing them beforehand.
[0051] It is not necessary to necessarily learn the call actuation in that case from the above-mentioned example that what is necessary is just appropriately.
[0052] For example, if the digitizing tablet 240 is touched [five] beyond fixed time amount, it is possible to display the template of a order-of-the-Japanese-syllabary array etc.
[0053] In Screen 2001, if virtual keyboard call actuation of a QWERTY mold is inputted, it will change to Screen 2003 and the virtual keyboard 430 of a QWERTY mold will be displayed.
[0054] Moreover, in Screen 2001, if virtual ten key call actuation is inputted, it will change to Screen 2003 and a ten key will be displayed.
[0055] Below, actuation of the **-ed key detecting element 242 is gradually explained according to transition of a condition.
[0056] First, a variable called N used in the following explanation is explained.
[0057] When setting to p the number of the finger pushed strongly, i.e., the pressure of top-most vertices, the number of top-most vertices which fills P2<p is set with N.
[0058] The display of a template will be eliminated, if the number of the finger which is pushing the digitizing tablet by the pressure beyond P1 is set to 0 when some templates, such as the virtual keyboard 430 of a QWERTY mold, are displayed on the indicating

equipment.
[0059] This condition is in an initiation condition and Screen 2001 of drawing 8 is equivalent to this condition.
[0060] The input which a digitizing tablet is weakly pushed with 3 or eight fingers, and fills (3) of software keyboard call actuation and (4) is set to input 1601A.
[0061] In the condition of Screen 2001, when input 1601A is inputted, this equipment starts the measurement for investigating whether the number of the crest in input 1601A continues fixed time, and changes to the condition of Screen 2002. Fixed time amount is for example, 200 mses.
[0062] In the condition of Screen 2001, when the input of those other than input 1601A is carried out, while telling that the **-ed key detecting element 242 does not have the key strongly pushed on the after-treatment module 243 with the finger for convenience, it tells a central processing unit 231 that it does not make it change with the display of a template erased. And a condition is still Screen 2001.
[0063] An "expedient top" is because the key area pushed strongly actually may exist here.
[0064] For example, when the actuation "four the digitizing tablet is touched beyond fixed time amount" is not defined as actuation of calling a certain template, suppose it that equipment was pushed by the pressure beyond P1 with four fingers, and was pushed by the pressure beyond P2 by at least one of push and 4.
[0065] In this case, although the key pressed by the pressure beyond P2 exists, I hear that it is told for convenience to the after-treatment module 243 that there is such no key, and it is.
[0066] In the condition of Screen 2002, with the number of the crest in input 1601A And if all the fingers are 8 about a ten key when it continues fixed time in the condition of pushing the digitizing tablet weakly, and the number of a crest is 3, they will display the virtual keyboard 430 of a QWERTY mold. While changing to the condition of a screen display 2003, it tells that the top-most vertices used as P2<p are included, namely, there is no key area pushed strongly to the after-treatment module 243.
[0067] In the condition of Screen 2002, the measurement for investigating whether the number of the crest in input 1601A continues fixed time, when top-most vertices are pushed [no] weakly and it has passed fixed time is continued with the number of the crest in input 1601A, and it remains in the condition of Screen 2002.
[0068] In the condition of Screen 2002, when the number of a crest which is pushing the digitizing tablet weakly differs from the number of the crest in input 1601A before passing fixed time, the measurement for investigating whether the number of the crest in input 1601A continues fixed time is canceled, and it changes in the condition of Screen 2001.
[0069] There are the following three kinds in Screen 2003.
[0070] (1) The number of a crest is one or more, and at the time of the input of N= 0, while telling that the **-ed key detecting element 242 does not have the key strongly pressed with the finger to the after-treatment module 243, tell a central processing unit 231 that the display of a template is not changed. And a condition is still Screen 2003.
[0071] (2) The number of a crest is one or more, and at the time of the input of N> 0, the **-ed key detecting element 242 tells a central processing unit 231 that it does not change the display of a template while telling all the key areas strongly pushed with the finger to

the after-treatment module 243. And a condition is still Screen 2003.
[0072] (3) When the number of a crest is 0, in the input none of whose fingers is pushing the digitizing tablet 240 by the pressure beyond P1, tell a central processing unit 231 that a template is not displayed while telling that there is no key strongly pressed by the **-ed key detecting element 242 with a finger to the after-treatment module 243. And a condition changes to Screen 2001.
[0073] Next, it explains in full detail per example of actuation of an information processor based on this invention using drawing 11 - drawing 32 .
[0074] Drawing 11 - drawing 16 are drawings showing the actuation flow of the information processor by this example.
[0075] In drawing 11 - drawing 16 , the part to which the part following "A:" follows "B:" in an intention of a user and the input to the equipment by the user shall express the reaction of the equipment to a user's input etc.
[0076] Steps 1000-1010 are explained.
[0077] A user pushes the power button 210 shown in drawing 2 , and he starts this equipment while he changes the power of a power source 209 into the condition which can be supplied to each part of electronic parts of this equipment. Then, this equipment displays the initial screen 400 as shown in a display at drawing 17 .
[0078] The example which reads an electronic mail is explained. A user performs actuation or equivalent actuation of a mouse pointer 225 using mouse equipment 220 or the same pointing equipment (it is hereafter called mouse equipment 220 grade), and chooses and performs the electronic mail starting icon 401.
[0079] Step 1011 is explained. This equipment starts e-mail software wear, displays a user name and the password input window 410 as shown in drawing 18 on a display, and urges the input of a user name etc. to the location of cursor 415 to a user.
[0080] Step 1020 is explained. A user wants to input the character string showing a user name. As shown in drawing 19 , a user places eight fingers except the thumb among ten fingers a user's left hand 421 and on the right of [422] a user like [when putting a hand on either side on the usual keyboard currently used for the general present], where index fingers on either side are fully detached. When it displays afterwards the virtual keyboard of a QWERTY mold "fully detaches", it is the semantics of while detaching only the distance which the part for the left hands of the virtual keyboard of a QWERTY mold and the part for right hands do not overlap here. About the virtual keyboard of a QWERTY mold, it mentions later.
[0081] Step 1021 is explained. This equipment judges that eight fingers were put on the digitizing tablet 240, and as shown in drawing 20 , it displays the virtual keyboard 430 of the QWERTY mold of the key pitch suitable for the user's finger on the location where the location which the right hand 421 and left hand 422 on a digitizing tablet set serves as a home position as it is.
[0082] It is the thing of how to place the finger with which in the case of the keyboard of a QWERTY mold the left index finger serves as a home position, and the location of the F key and the right index finger serve as a location of the J key.
[0083] According to this example, a user can make a home position the location which placed the hand on the indicating equipment as it is. For this reason, it is not necessary to move a look to a part for the display of the virtual keyboard 430 of a QWERTY mold, and to move a finger for the adjustment which doubles the location of a finger with the

location of a home position. That is, a user can use the virtual keyboard 430 of a QWERTY mold, without separating a look from the insertion point of a character string. Therefore, visual fatigue of a user can be decreased and the operate time of the part which adjusts the location of a finger or moves a view further can be shortened.
[0084] Moreover, key pitch is the distance of the center to center of two keys of the arbitration which adjoined each other and was located in a line with the longitudinal direction.
[0085] Since the gestalt of fingers including a size changes with individuals, as for the key pitch of a keyboard, it is desirable that it is adjustable.
[0086] Or it registered suitable key pitch beforehand for every the (user) in the case of the conventional virtual keyboard, it needed to be operated that a user performs a certain actuation clearly and adjusts it using (2) control panels etc.
[0087] However, since this equipment determines the key pitch which suited the user based on the distance of the fingers which contact to a digitizing tablet 240, assignment of key pitch can perform it directly and automatically.
[0088] Furthermore, it is thought that the distance of the adjacent fingers in the condition of having opened the finger automatically differs for every finger since the sizes of a finger differ for every finger. This equipment can also offer the virtual keyboard 430 which doubled key pitch with spacing of each adjacent finger automatically. An impossible motion of a finger can be mitigated by this and a physical burden can be reduced.
[0089] The part currently displayed from the first may display in the translucent condition that the virtual keyboard 430 of the QWERTY mold in the condition of drawing 20 does not hide as much as possible by the display of the virtual keyboard 430 of a QWERTY mold, and it may be displayed in the opaque condition. If it displays in the translucent condition, a user also recognizes the part currently displayed from the first, and it has the advantage that information can be used.
[0090] It is for making it the part currently displayed as the translucent condition in the display of the virtual keyboard 430 of a QWERTY mold from the first not hide as much as possible by the display of the virtual keyboard 430 of a QWERTY mold, and the display of the virtual keyboard 430 of a QWERTY mold is transparent, and it overlaps mutually, and is made visible from on the part currently displayed on the indicating equipment from the first. A user changes only the value of dot sufficient in distinguishing a key among the display dots of a display so that the part which hides among the parts currently displayed from the first may decrease. By carrying out like this, a user can also recognize the part currently displayed from the first to some extent, and information can be used.
[0091] Steps 1022-1056 are explained. A user enters a right user name and a right password by typing with a finger using the virtual keyboard 430 of the QWERTY mold displayed on the indicating equipment.
[0092] Then, a system displays screen 400E of an e-mail title list as shown in drawing 21 . As for 452, a title expresses the electronic mail of "invitation of a hot spring travel." 453 is a rectangle region to which a title expresses the electronic mail of "the other day is thank you." 454 is a rectangle region to which a title expresses the electronic mail of "the comment which has seen xxx." 455 is a rectangle region to which a title expresses the electronic mail of "thank you." 456 is a rectangle region to which a title expresses the

electronic mail of a "recent state." 452, 453, 454, 455, and 456 show the transmitting person and the title about the electronic mail which has arrived to the user now.
[0093] Step 1060 is explained. Using mouse equipment 220 grade, a user operates mouse cursor 225 grade if needed, and chooses and performs a rectangle region 452.
[0094] Step 1061 is explained. This equipment displays the content of "invitation of a hot spring travel" on a display. In this example, this equipment shall display the text on the display upper part, and shall display a pamphlet on the lower part.
[0095] Drawing 22 explains "invitation of a hot spring travel" and the situation of a display of the pamphlet which is the attached paper. 610 is a window which displays the text of the mail "invitation of a hot spring travel" which the user received. 620 is the window of the content of a reception mail attachment pamphlet. In this example, it is the pamphlet of a hot spring. Moreover, 601 is a menu bar and 602 is a menu item for displaying the sub menu relevant to a "message."
[0096] Steps 1070-1071 are explained. A user presupposes the content of the window 610 on a screen, and the window 620 of the content of a reception mail attachment pamphlet that reading and an answer are written.
[0097] A user explains the appearance of the screen at the time of selection and activation for the menu item to which drawing 23 starts answer creation. 603 is a sub menu relevant to a "message." 603A is one of the sub menu of this, and is a menu item for choosing and executing an answer creation command. 603B is one of the sub menu of this, and is a menu item for choosing and executing a transfer command. 603C is one of the sub menu of this, and is the menu items for choosing and executing a transmitting command.
[0098] Drawing 24 explains the appearance of the screen when displaying a window for a user writing an answer. A user is the screen of drawing 23 and chooses menu item 603A which creates an answer using mouse equipment 220 grade. Then, this equipment displays the window 640 for a user to write an answer on a display. Others are the same as explanation of drawing 22 .
[0099] Steps 1100-1103 are explained. In drawing 25 , 431 is a return key field and 432 is a space-key field. First, a user touches a digitizing tablet 240 with 8 fingers except the thumb of a right hand 421 and a left hand 422. Then, this equipment displays that the virtual keyboard 430 of a QWERTY mold suits at the home position of each finger of a user on an indicating equipment.
[0100] If a user is required, he will switch to Japanese input mode using the key in the virtual keyboard 430 of a QWERTY mold. Here, the Roman alphabet kana conversion known by usual and a kana-kanji conversion shall be used. And how much "typing-with hiyouhadonokuraikakarisoudesuka?"" hail are likely to start? The conversion type of letters "is inputted. And a user changes and decides by typing with a finger the space-key field 432 which is a key area for conversion like the usual kana-kanji conversion actuation. Then, how much "costs does this equipment require? The character string "is inserted in the location of cursor 415, and is displayed on a display. As for the kana-kanji conversion system of this example, the space key shall make the conversion key serve a double purpose.
[0101] How much "costs does drawing 26 require? The condition of a screen when a user inputs the character string a line feed code and a "pamphlet", following the input of the character string "is explained. A line feed code can be inputted by pushing the return key field 431. 651 is the character string inserted by the input and others are the same as

explanation of drawing 25 .
[0102] Step 1104 - step 1105 are explained. When a user separates a right hand 421 and a left hand 422 from a digitizing tablet 240, as shown in drawing 27 , the virtual keyboard 430 of a QWERTY mold is no longer displayed on a display.
[0103] Generally, only when inputting, if the virtual keyboard is displayed, it is enough. It is enough if displayed only in the condition that the user is touching the digitizing tablet 240 if it says with this equipment. If it is displayed when other, as for the part and display with which the virtual keyboard is displayed, a screen product will decrease substantially.
[0104] This equipment can perform actuation of erasing the display of the virtual keyboard 430 of a QWERTY mold automatically, by lifting all the fingers of both hands from a digitizing tablet 240 with completion of an input. Therefore, the substantial decrease of the screen product by the display of the virtual keyboard 430 of a QWERTY mold can be prevented with little operating procedure.
[0105] Steps 1110-1111 are explained. If a user returns a hand on a digitizing tablet 240 again, the condition 430 of drawing 26 , i.e., the virtual keyboard of a QWERTY mold, will be displayed, and it will return to the condition in which an alphabetic character input is possible. After a user continues text alter operation and completes an answer, he chooses and performs menu item 603C showing the transmission shown in drawing 23 using mouse equipment 220 grade, and transmits e-mail.
[0106] Explanation is omitted about subsequent actuation.
[0107] The behavior of this equipment in the case of being displayed on the location which the window where the user is going to perform the alphabetic character input laps with the finger of the user who set on the display screen hereafter, and stops being able to be visible easily is explained.
[0108] For example, as the appearance of the screen in the above-mentioned step 1071 is drawing 24 , it is the case where it is displayed on the bottom of screen to which the window 640 of answer creation is likely to lap with a user's finger like drawing 28 . Although it is desirable to carry out looking at input progress as for the input of a character string etc., if no special responses are performed in such a case, it is difficult to input looking at input progress.
[0109] Steps 1312-1313 shown in drawing 15 are explained. A user touches a digitizing tablet 240 with 8 fingers in order to input a text. Then, the location of a user's finger displays that the virtual keyboard 430 of a QWERTY mold becomes a home position, this equipment scrolling the display of an indicating equipment upwards.
[0110] Drawing 29 and drawing 30 are drawings for explaining the situation of this scrolling. Drawing 29 is a situation when a user's both hands 441 and 442 have not touched a digitizing tablet 240 yet. Drawing 30 is in the condition which the screen of a display scrolled upwards automatically just before the virtual keyboard 430 of a QWERTY mold was displayed so that a window 640 may not hide with a finger with the both hands 441 and 442 with which the digitizing tablet 240 was touched.
[0111] A user can set up also so that this automatic scrolling feature may be performed and it may not carry out.
[0112] Step 1320 - step 1333 are explained. How much "costs are likely to start like drawing 31 in a user? In the place inputted as pamphlet (line-feed character)", it carries out to wanting to have come to see the window 620 of the content of a reception mail

attachment pamphlet. However, in this condition, the window 620 of the content of a reception mail attachment pamphlet has separated from a part for a visible region in scrolling to the upper part of the display by step 1321. Here, if all fingers are temporarily lifted from a digitizing tablet 240 as shown in drawing 32 , scrolling to the upper part will be canceled and the window 620 of the content of a reception mail attachment pamphlet will be displayed on a display.

[0113] A user continues an input by putting eight fingers on a digitizing tablet 240 again, after referring to the window 620 of the content of a reception mail attachment pamphlet. If a text is completed, it will choose and perform and the menu item showing transmission will be transmitted.

[0114] Hereafter, explanation of actuation is omitted until it cuts a power button 210.

[0115] As explained in full detail above, since the information processor of this example does not need to form a mechanical keyboard, it can achieve lightweight-izing and thin-shape-izing of the whole equipment.

[0116] Moreover, since templates, such as a keyboard, are displayed on an indicating equipment and the input of a character string etc. is made to a digitizing tablet by contacting a finger etc., actuation in which a mechanical keyboard exists can be performed and decline in the input effectiveness in the equipment which does not form a mechanical keyboard can be prevented.

[0117] Moreover, since it is a virtual keyboard method, a user can be provided with various templates. With various templates here, while diverseness, such as a configuration of a display position, key pitch, and a key area, is included, label attachment of a key, diverseness of an array, etc. including a multi-language response or a function are included. In the case of the keyboard of an alphabetic character input, besides the array of the QWERTY type known by usual, if it is a DVORAK array and Japanese, specifically, a user can be provided with the input which displays the array of the order of the Japanese syllabary etc. A user can be provided with the input which displays the array of the keyboard of a piano etc. a ten key array and for music on a numerical input. Moreover, it can be made to display for every application software, changing label attachment of a function key.

[0118]

[Effect of the Invention] According to this invention, with the virtual keyboard displayed on the display screen of an information processor, as stated above, since actuation of the input of a character string etc. can be performed, thin lightweight-ization of equipment can be realized and an alphabetic character etc. can be inputted efficiently.

[Claim(s)]

[Claim 1] It is based on the pressure detection means for detecting the pressure concerning the display screen, and the detected pressure signal. Where the means for displaying the keyboard of the class corresponding to said pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal and said keyboard are displayed The information processor characterized by having a pressure detection means for detecting the pressure concerning the location corresponding to each key of said keyboard of said display screen, and a

means for processing information based on the pressure signal of each of said detected key.
[Claim 2] A means to detect the pressure concerning the display screen to two or more steps according to the magnitude, The means for displaying the keyboard of the class corresponding to the detected pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal, when the magnitude of the detected pressure is in the first pressure range, The information processor characterized by having a means for recognizing that said key was specified when the pressure in the second pressure range is detected in the location corresponding to one key of said keyboards, where said keyboard is displayed.
[Claim 3] Said second pressure range is an information processor according to claim 2 characterized by being a larger pressure range than said first pressure range, without having the range which overlaps said first pressure range.
[Claim 4] Claim 1 characterized by having the means which carries out automatic scrolling of the screen so that it may be displayed on the location where said cursor does not overlap said keyboard, when cursor is displayed on the location which overlapped said keyboard, where said keyboard is displayed thru/or claim 3 are the information processor of a publication either.
[Claim 5] 4 is [claim 1 characterized by having a means for displaying said keyboard in the translucent condition thru/or] the information processor of a publication either.
[Claim 6] Claim 1 characterized by having a means for eliminating the display of said keyboard in the condition that said keyboard was displayed when not detecting the pressure more than predetermined magnitude beyond predetermined time thru/or claim 5 are the information processor of a publication either.
[Claim 7] For said keyboard, claim 1 characterized by being either a QWERTY mold keyboard, a DVORAK mold keyboard, a ten key or a music keyboard thru/or claim 6 are the information processor of a publication either.
[Claim 8] Claim 1 characterized by displaying the keyboard of a QWERTY mold on said display screen in the condition that said keyboard is not displayed when a pressure is detected to eight on said display screen thru/or claim 7 are the information processor of a publication either.
[Claim 9] Claim 1 characterized by displaying a ten key on said display screen in the condition that said keyboard is not displayed when a pressure is detected to three on said display screen thru/or claim 8 are the information processor of a publication either.
[Claim 10] Claim 1 characterized by displaying a order-of-the-Japanese-syllabary keyboard in the condition that said keyboard is not displayed when a pressure is detected to five on said display screen thru/or claim 9 are the information processor of a publication either.
[Claim 11] Where the process which detects the pressure concerning the display screen, the process which displays the keyboard of a predetermined class on the position of said display screen in predetermined size based on the detected pressure signal, and said keyboard are displayed Operating instructions of the information processor characterized by having the process which detects the pressure concerning each key of said keyboard displayed on said display screen, and the process which processes information based on the pressure signal of each of said detected key.
[Claim 12] The process which detects the pressure concerning the display screen to two

or more steps according to the magnitude, The process which displays the keyboard of the class corresponding to the detected pressure signal on the location corresponding to said pressure signal of said display screen in the size corresponding to said pressure signal when the magnitude of the detected pressure is in the first pressure range, Operating instructions of the information processor characterized by having the process which recognizes that said key was specified when the pressure in the second pressure range is detected in the location corresponding to one key of said keyboards, where said keyboard is displayed.

[Claim 13] Said second pressure range is the operating instructions of the information processor according to claim 2 characterized by being a larger pressure range than said first pressure range, without having the range which overlaps said first pressure range.